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Volume 3

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Volume 3

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AIR POLLUTION TRANSLATIONS: A BIBLIOGRAPHY WITH ABSTRACTS –
VOLUME 3

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March 1973

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The AP series of reports is published by the Technical Publications Branch of the Information Services Division of the Office of Administration, Environmental Protection Agency, to report the results of scientific and engineering studies and information of general interest in the field of air pollution. Information reported in the series includes coverage of intramural activities and of cooperative studies conducted in conjunction with state and local agencies, research institutes, and industrial organizations. Copies of AP reports are available free of charge to Federal employees, current contractors and grantees, and nonprofit organizations - as supplies permit - from the Air Pollution Technical Information Center, Environmental Protection Agency, Research Triangle Park, North Carolina 27711, or from the Superintendent of Documents.

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AIR POLLUTION TRANSLATIONS:
A BIBLIOGRAPHY WITH ABSTRACTS –
VOLUME 3

INTRODUCTION

This volume of Air Pollution Translations: A Bibliography with Abstracts is the third in a continuing series of compilations presenting abstracts and indexes of translations of technical air pollution literature. Although some entries indicate otherwise, all documents abstracted and indexed in this volume have been translated and are available in English.

Approximately 95 percent of the documents were translated for the Translation Services Section, Environmental Protection Agency, by extra-governmental contractors. Of the remainder, approximately 3 percent were obtained by screening published translation documents and 2 percent by screening the output of other translation services within and without the Federal government. Documents are translated or obtained by the Translation Services Section only at the request of EPA scientists.

The entries are grouped into subject categories and arranged in numerical order using the Air Pollution Technical Information Center (APTIC) accession number. Subject and author indexes refer to the abstract by category letter and APTIC accession number. For example, the number B-21324 refers to Section B, Control Methods, and to accession 21324 within it. The asterisks in the author index denote the first author.

Copies of all documents abstracted herein are available from the Air Pollution Technical Information Center, Environmental Protection Agency, Research Triangle Park, N. C. 27711. Readers outside the U. S. Government may obtain copies from the National Translation Center, The John Crear Library, 35 West 33rd Street, Chicago, Ill. 60616.

Included in this bibliography is a listing of monograph and journal translations prepared for the Environmental Protection Agency under the P. L. 480 program* and through research grants. These publications can be obtained from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, Va. 22151.

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*P. L. 480 of 1954 authorizes agreements for the sale abroad of surplus U. S. agricultural commodities for foreign currencies. Although they cannot be used outside the country involved, these currencies may be used "to collect, collate, translate, abstract, and disseminate scientific and technological information....".

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A. EMISSION SOURCES

01535

S. Hulanicki, B. Glowink

(INVESTIGATION OF THE SELF-IGNITION OF DUSTS IN THE FLOUR MILLING INDUSTRY.) Badania nad Samozapalnoscia Pylow Wystepujacych w Przemysle Zbozowym. Ochrona Pracy (Warsaw), 21(5):18-21, May 1966.

Methods for determining physical properties of dusts such as the self-ignition point and the activation energy of self-ignition are discussed. Results of investigations on the self-ignition of corn dusts by the Swietoslawski-Roga method and methods developed by the authors are presented.

06240

Y. Suzuki, K. Nishiyama, M. Oe, and F. Kametani

STUDIES ON THE PREVENTION OF PUBLIC NUISANCE BY THE EXHAUST GASES FROM THE KRAFT PULP MILL. (PART I. ANALYSIS OF EXHAUST GASES.) ((Tohoku J. Exp. Med. (Tokyo))) 11 (2), 120-6 (Aug. 1964). (Presented at the 37th Annual Meeting, Japan Society of Industrial Medicine, Kurume, Apr. 7, 1964.)

Exhaust gases of a Japanese kraft pulp mill were analyzed. The reported results were as follows: In the stack gases were contained: 0.259 g/cc of sodium sulfate, 750 ppm of hydrogen sulfide, 196 ppm of sulfur dioxide and organic compounds of sulfur. The organic sulfur compounds were as follows in order of amount: methyl mercaptan, dimethyl sulfide, isopropyl mercaptan, dimethyl disulfide, propyl mercaptan or ethyl methyl sulfide, diethyl sulfide and ethyl mercaptan. The amount of dimethyl sulfide was 8.7 ppm. Organic sulfur compounds in the gases in the upper part of the Jansson screen were of the same composition as those in the stack gases, but the arrangement of the constituents in order of amount are somewhat different. All of these gaseous sulfur compounds smell offensive and characterize the exhaust gases from a kraft pulp mill. (Author conclusion)

08524

Kapkaer, E. A., L. V. Trofimova, N. A. Evikeeva, and A. K. Monkevich

HYGIENIC EVALUATION OF SOME PETROCHEMICAL INDISTRIES. ((Gigienicheskaya otsenka nekotorykh neftekhimicheskykh proizvodstv.)) Text in Russian. Gigiena Truda i Prof. Zabolevaniya (Moscow), 10(11):22-28, Nov. 1966. 10 refs.

Deficiencies in planning and actual operation of petrochemical plants are responsible for the discharge of acetylene, polyethylene, phenol, acetone, methylstyrene, isoprene, divinyl and other toxic complexes which are products of decomposition, oxidation, and hydrolysis. Desorption of toxic substances from construction materials (concrete brick) plays an important part. The authors recommend methods for improving working conditions in petrochemical production facilities. (Authors summary, modified)

08816

Rose, Gerhard

WILL TRASH REMOVAL BE A MARKETING FACTOR FOR THE GLASS CONTAINER INDUSTRY AND PRODUCERS OF OTHER PACKAGING MATERIAL? ((Wird die Abfallbeseitigung zu einem Marktfaktor fur die Verpackungsglas- industrie und die Hersteller anderer Verpackungsmittel? Text in German. Glastech. Ber., 40(11):430-436, Nov. 1967.

While the removal of discarded glass containers presents a problem, it is not insurmountable, particularly if refuse crushing plants and techniques are developed which will refuse the silicon from waste glass. The substitution of plastic packaging materials for glass has the disadvantage that during incineration of polyvinyl-chloride-containing material, corrosive gases are evolved, which cause severe damage to the boiler units of the incinerator plant. Furthermore, the emission of hydrochloric and hydrofluoric acids from these plastics causes dangerous air pollution to such an extent, that in the United States the incineration of plastic waste is forbidden in the vicinity of large cities.

09541

Sprung, S., and H. M. V. Seebach

FLUORINE BALANCE AND FLUORINE EMISSION FROM CEMENT KILNS. ((Fluorhaushalt und Fluoremission von Zementofen.)) Text in German. Zement-Kalk-Gips (Wiesbaden), 21(1):18, Jan. 1968. 20 refs

In the burning of Portland cement clinker, fluorine is partly driven out of the raw materials and fuel. To determine whether gaseous fluorine is emitted along with the other kiln gases, complete fluorine determinations were performed for 11 cement kilns of varying design. No gaseous fluorides could be detected in the cleaned gas from these kilns; the significance of electrofilters in the removal of solid fluorides is discussed. In conclusion, cement kilns cannot emit gaseous fluorides because, in the presence of an excess of CaO, they produce CaF2. The negligible level of fluorides in the dust from the cleaned gas (0.009-1.420 mg. F/Nm to 3rd power) is thus not dependent upon the magnitude of the fluorine balance, but upon the efficiency of the electrostatic precipitators. The amount of fluorine combined in the clinker ranges from 88-98 percent of the total fluorine intake, and this percentage increases with a decrease in dust load of the emitted gas. Fluorine appears as CaF2 in clinker and kiln dust and, as such, is harmless since CaF2 is relatively insoluble in water.

09935

Borowicz, Andrzej, Barbara Blazejewska, Roman Plackowski, and Sabina Tyczka

STUDIES OF AEROSOL CONTENT IN THE AIR IN THE GRADUATION HOUSE ZONE IN CIECHOCINEK. ((Badania nad zawartoscia aerozolu w powietrzu w strefie okolotezniowej w Ciechocinku.)) Text in Polish. Otolaryngol. Polska (Warsaw), 21(6):775-779, 1967.

A peculiarity of the Ciechocinek climate is the presence of an atmospheric saline aerosol which might be used in inhalation therapy. This aerosol originates from the saline graduation house (aerosol forming structure) which operates from spring into the late fall and is distributed by the wind. Tests made in 1966 established the correlation between the extent of the aerosol zone, measured as concentration of sodium ions, and the weather. Atmospheric iodine levels were also measured, as well as temperature, humidity, wind direction, wind velocity, and other meterological conditions. Results were tabulated. NaC1 level, taken as an exponent of saline aerosol level, was 0.03-10.066 mg. NaC1 cu m. At higher temperatures, aerosol particles were concentrated due to intense water evaporation. Atmospheric iodine levels were 0-43.4 gamma/cu m. Comparatively high iodine levels were observed at low wind velocities. Anemometric measurements for the past 30 years indicate that western winds prevail in Ciechocinek. Consequently, the planned inhalation therapy zone should be established east of the saline graduation house.

11739

Ritchings, F. A.

RAW ENERGY SOURCES FOR ELECTRIC GENERATION. IEEE (Inst. Elec. Electron. Engrs) Spectrum, 5(8):34-45, Aug. 1968.

Air pollution is one of several factors taken into consideration in this forecast of the electrical energy picture in the USA through 1985. Other factors include economics, fuel availability, relative plant size, and transportation costs. It is predicted that the consumption of all forms of raw energy for electric power generation will increase substantially during the next 15 years, probably at 3 times the rate of total energy consumption (3.1--4.5%/yr.). By 1985, nuclear energy will provide more than 40% of the electric power produced in the USA, and probably more than 70% of that produced in New England. Of the 4 major sources of energy currently exploited for electric power generation: coal, gas, water, and oil (nuclear energy accounted for only 0.4% of the total output in 1965), coal is the only one for which the resources are almost unlimited (900 yr. at present rate of consumption). However, under the Air Quality Act of 1968, coal - or oil-fired generating units 'will either have to burn the higher-cost, low-sulfur fuels or provide some means of reducing the SO2 content of stack gases.......' '.....the simpler SO2 removal systems, without provision for sulfur product recovery, may require an investment of $7 to $8 per kilowatt and result in an owning and operating cost equivalent to a fuel cost of 3 to 4 cents/MBtu. This will further accelerate the trend to nuclear energy sources in the traditionally coal and oil-burning areas.'

11915

W. Schneider, and E. Schoeffmann

COMPARATIVE STUDIES OF FLUORINE-CONTAINING EMISSIONS. ((Vergleichende Untersuchungen uber Fluorhaltige Immissionen.)) Text in German. Stadtehygiene, 19(6):114-115, June 1968.

Three methods determining the presence of fluorine compounds as phytotoxic air pollutants are under consideration: (1) air analysis, (2) precipitate analysis, and (3) plant studies. In the past, proof of damage was accepted if fluorine concentrations in the leaves of damaged plants were higher than those in plants in unpolluted areas. Recently air measurements were made at 7 stations in a recreation area containing large forests and several water surfaces, at the same time as dust studies of precipitates from washed and unwashed birch, popular, and plantain leaves. The differences found in the fluorine values (0.5-1.0 microgram F/N cu m in the air and 25.8 mg F/sq.m. in the percipitate) may be partially attributed to the filtration effect of forests (particularly with aerosols) which results in reduced emissions (the authors' belief). An increased concentration of fluorine in plants is neither proof of increased fluorine in the air nor the cause of plant damage. Leaves from plants both with and without damage showed an increased fluorine content with little difference between values. The most common fluorine compound, calcium fluoride, does not cause plant damage and occurs only as a dust which is trapped by dense forests. Because of this, the point of collection is important when measuring for fluorides. Fluoride emissions in industrial concentrations are difficult to determine because of small fluoride emissions coming from many directions.

11934

Rasch, R.

FURNACE SYSTEMS FOR REFUSE INCINERATION. (Ofensysteme fuer die Muellverbrennung). Brennstoff-Waerme-Kraft, 16(8):376-382, Aug. 1964. 11 refs. (Presented at the 3rd Muelltechnischen Colloquium of the TH Stuttgart, Feb. 21, 1964.) Translated from German. Iron and Steel Inst., London (England), British Iron and Steel Industry Translation Service, 25p., May 1966.

Various furnace systems for refuse incineration are described and classified in terms of size and type of combustion grating. Grating systems considered are the fixed-grate, the movable grate without agitation, and the agitated grate. Grateless systems are also reviewed; these include the Riepel-Scherer-Ridl Process with slagging, the flame chamber process with slagging, and the Stauff Process with combustion in suspension. It is recommended that special quality liners be provided for combustion chambers because of excessive wear caused by refuse burning as compared with coal. A limit of 100,000 kcal/cu m is set for the fire chamber load. The use of hot waste gases to pre-dry refuse and to reduce combustion chamber temperature is mentioned. Waste gas temperature must be reduced to 350 C to assure proper induced draft and to protect gas purification equipment. Heat recovery in the form of steam has limited economic importance. Ash removal and post-sintering of refuse ash to produce construction material are also discussed briefly.

11971

Ferber, Michael

TRASH INCINERATION AND AGGLOMERATING PLANT IN BERLIN. (Muellverbrennungs- und -sinteranlage in Berlin). Brennstoff-Waerme-Kraft, 16(8):409, Aug. 1964. Translated from German. 1p.

An incineration plant for city trash and some industrial refuse, scheduled for completion in Berlin-Ruhleben in 1968, is described. The refuse, together with heating slag, fly ash from power plants, and sludge from a neighboring clarification plant are processed in an agglomerating belt installation into admixtures for concrete. Excess heat will be used for steam at 24 excess atm, 430 C for municipal heating purposes. When completed, a daily maximum of 2000 tons can be processed with a daily agglomerate production of about 1000 tons. This will correspond roughly to half the total trash output of the entire West Berlin metropolitan area. A population of 2.2 million, with an annual trash load of about 3.3 million cu m (about 870,000 tons), is projected after 1972.

12975

Yamada, Go

CORROSION ATTACK OF BOILERS BURNING HEAVY-OIL. (Juyu boiler no fushoku shogai). Text in Japanese. Netsu Kanri (Heat Engineering, Tokyo), 21(3):2-9, March 1969. 5 refs.

Sulfur trioxide is a major cause of corrosion in boilers burning heavy oil. Sulfur compounds in heavy oil are oxidized to SO2 and SO3 during combustion. Sulfur trioxide combines with water vapor to form sulfuric acid, which corrodes surfaces at temperatures below the acid dewpoint of flue gas. Maximum corrosion occurs at 30-40 C lower than acid dewpoint. Meanwhile, on high temperature surfaces, alkali metal sulfates, formed from inorganic compounds, sulfur oxides, and oxides of vanadium accumulate, impede thermal condition, and cause corrosion. Sulfur trioxide is considered to be formed by (1) the reaction between SO2 and O2 in the vapor phase, (2) the oxidation of SO2 in flame, and (3) the contact oxidation of SO2 on metallic surfaces. Calculating the conversion rate of SO2 to SO3 at equilibrium in (1), the greater the O2 and the lower the temperature, the larger the rate becomes. However, equilibrium does not occur in boilers, so the actual conversion rate is 1 to 4%. In (2), the greater the amount of sulfur included in the oil and the hotter the flame, the greater the amount of SO3 formed. These findings suggest that combustion with low excess O2 can reduce corrosion. Low-temperature corrosion can additionally be controlled by additives, such as ammonia, magnesium and calcium compounds; high temperature corrosion by carbonates, hydroxides, and oxides of alkaline earth metals.

13112

Beck, Horst

AIR POLLUTION PROBLEMS AT INCINERATORS WITH CAPACITIES UP TO 5 TONS/HR. (Probleme der Luftreinhaltung bei Abfallverbrennungsanlagen mit Durchsatzleistungen bis zu 5 t/h). Text in German. Energie Tech., 21(6):207-210, June 1969.

With the increasing use of incinerators for waste disposal, regulations concerning the emission have become stringent. Ver. Deut. Ing. standard 2301 (Feb. 1967) calls for a reduction of stack emission of particulate matter to 200 mg/cu m for moist flue gas (with a CO2 content of 7%) from incinerators with a capacity of less than 1.5 t/hr. Incinerators with a higher capacity are to be equipped with the most recent dust collectors. Efficient flue gas cleaning depends very much on the selection of a suitable cleaning facility. Many factors such as grate construction, size of the combustion chamber, capacity, composition of the waste material, heating value, excess air, and dust concentration of the dirty gas ought to be considered. If wet dust collectors are used, waste water purification facilities must be available. Cyclones and multiclones can be used presently only with incinerators whose flue gases carry low dust concentrations. The advantage of such dust collectors is their small size. Electrostatic precipitators are gaining increasing importance, particularly when operated in connection with a multiclone. But the newest and most suitable dust collectors for the present composition of flue gases are probably bag filters. Europe's most modern incinerator, erected in Berlin and inaugurated in 1968 (capacity of the plant is 750 kg/hr), has been equipped with such a facility after satisfactory results had been gained with a bag filter in Switzerland. Depending on the need, such filters can be equipped with silicon-treated glass fiber bags of tubular shape or with synthetic fiber bags. Periodically, the tubes are shaken to dislodge the dust and cause it to fall into the collecting hopper. Such filters separate dusts which are in the submicron range.

13246

Gavrilov, A. A.

WETTING AGENT 'DB' FOR HYDRAULIC REMOVAL OF DUST. (Smachivatel' 'DB' dlya gidroobesylivaniya). Text in Russian. Metallurg, no. 12:11-12, 1968.

Addition of 0.01-0.1% 'DB' wetting agent (polyoxyethylene ester of ditertiary butylphenol) gives water a surface tension of 28- 31 erg/sq cm, and used in hydraulic dust removal from the coke supply for blast furnaces, yields a 70-90% reduction in dust with 0.3-1% moistening. The mixture was tested on standard equipment at a consumption rate of 0.5-0.6 cu m/hr or 3 liters of water per ton of coke with 0.08% of wetting agent; 0.3% moistening. Current tests are being made with a 7.5 liter/ton consumption rate and a 0.006 liter/ton wetting agent.

13622

Zurich, R. Tanner

OPERATING RESULTS OF THE INCINERATOR OF THE CITY OF LAUSANNE. (Betriebsergebnisse der Muellverbrennungsanlage der Stadt Lausanne.) Translated from German. Brennstoff-Waerme-Kraft (Duesseldorf), 20(9):430-432, 01968.

The performance of the Von Roll incinerator in Switzerland is discussed based on data compiled for the years 1959 to 1967. Emphasis is placed on investment and operating costs, design (flue gases are cleared using electrostatic precipitators), operating results, and personnel. It is concluded that although the main task of an incinerator is the hygienic disposal of waste, such a plant should operate with enough safety margin to avoid long interruptions. The Lausanne plant owes its success exclusively to the standby units and to its design, which makes monitoring during operation easy for the personnel.

14596

Arkhipova, O. G.

MECHANISM OF ACTION OF THE NEW ANTIKNOCK COMPOUND MANGANESE CYCLOPENTADIENYLTRICARBONYL ON THE ORGANISM. English translation of: Gigiena Truda i Prof. Zabolevaniya (Moscow), No. 4:T51-T54, 1963. 5 refs.

It has been suggested that manganese cyclopentadienyltricarbonyl (MCT) be used as an antiknock compound in internal combustion engines to replace tetraethyl lead. Investigations which give a general description of the changes that occur in the organs and systems of organisms following the administration of MCT are reported. The compound was administered by inhalation to rabbits and white rats. Results showed that the MCT is a toxic substance of polytropic action; MCT vapor disturbs the function of the nervous system and kidneys, and reduces the osmotic resistance of the erythrocytes. It affects the normal source of the oxidation process and the processes of oxidative phosphorylation. Oxygen inhalation has favorable effect in acute MCT intoxication.

14701

Bretschneider, B.

MAIN SOURCES OF INDUSTRIAL GASEOUS EMISSIONS. (Hlavni zdroje prumyslovych plynnych exhalaci). Text in Czech. Ochrana Ovzdusi, no. 2:26-30, 1969. 29 refs.

Sulfur dioxide is the most harmful gaseous emission in Czechoslovakia. The primary source of sulfur dioxide emission, which reached approximately 25 million tons in 1966, are power engineering, e.g., powerhouses, boiler houses, heat plants, etc., surface mining of sub-bituminous coal in Northern

Bohemia, and domestic fireplaces. The latter are particularly important sources of pollution in residential and urban areas. Powerhouses of the Central Board of Power Engineering emit as much sulfur dioxide as the powerhouses and boiler houses of industrial plants. Their emissions contaminate the lower atmosphere of whole areas. Air quality in the CSSR, especially in Northern Bohemia and around industrial complexes, can be raised by controlling the diffusion of sulfur dioxide and combustion products in the lower atmosphere. Less important sources of gaseous emissions are metallurgical engineering plants, which produce both sulfur dioxide and monosulfide, and chemical works whose emissions, though low, can be extremely harmful. Emissions from powerhouses of industrial plants are of local importance.

15637

Muhlrad, M. Wolf

CEMENT PLANTS AND ATMOSPHERIC POLLUTION. PROBLEMS OF DUST REMOVAL. (Les cimenteries et la pollution atmospherique. Les problemes de depoussierage). Text in French. Equipement Mecan., 48(87):91-95, 1969.

Cement plants have the most formidable dust removal problems among industrial dust and smoke emission sources. The centrifugal, the wet, the electrostatic, and the screen filtering, methods of dust separation are described in detail; dust sources and the dust collecting equipment used in the individual successive stages of cement production are considered. Quarrying limestone in open air gives rise to moderate quantities of dust, which are sometimes sprayed with water. Pounding and crushing limestone calls for the use of multitubular centrifuges followed, if need be, by screen filters. Wet crushing produces no dust, while dry or semi-dry crusing requires high-capacity, fine-mesh, movable screen filters. Electrostatic filters are occasionally used instead. Homogenizing requires limited dust removal. Drying and crushing of coal pose difficult dust removal problems due to the danger of coal-dust explosions. Smoke from roasting kilns is the primary source of dust. Particle size distributions and concentrations of dusts from six kinds of roasting kilns are given in a Table. Most modern kilns are provided with electrostatic filters. Clinker cooling uses dust centrifuges. Clinker crushing sometimes uses electrostatic filters but, more commonly, bag filters with movable screens. Automatic cement bagging machines usually have movable screen filters made of nylon. At present, no satisfactory solution of the problem of dust removal in cement plants exists, so that the establishment of new cement plants should still be based on considerations of dispersal of dust emissions in the atmosphere.

16254

EFFECTS OF VARIATIONS OF THE WASTE COMPOSITION ON DESIGN PARAMETERS OF INCINERATORS. (Die Auswirkungen von Schwankungen der Muellbeschaffenheit auf einige Konstruktionsparameter von Muellverbrennungsanlagen). Brennstoff-Waerme-Kraft, 20(9):428- 429, 1968. 1 ref. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 6p., Sept. 25, 1969. (Presented at Winter Annual Meeting of the American Society of Mechanical Engineers, Pittsburgh, Pa., 1967.)

A computer program was developed to find the limits within which the waste composition may change and to find the effects of the changes on the various parameters. The program is executed with the following values: upper heating value from 2225-4450 kcal/kg, carbon from 24-405%, hydrogen from 3.5-7.5%, oxygen from 20-30%, water from 11-30%, incombustible material from 11-22.5%, and carbon/hydrogen ratio from 10.8-24. It was shown that the heating value increases with increasing content of free hydrogen. If the waste composition and heating value, air surplus, and heat loss are given, the combustion products at a capacity of 900 kg/h can be found with the computer program. The specific heats and enthalpies can be found and a heat equation can be established to determine the equilibrium gas temperature. The computer program also helps to find the amount of water required for cooling flue gases to 540, 400, 260, 120 C, or to saturation. It also determines the mass and volume flow at every important point in the circulation. All calculations include a certain assumed percentage of incombustible material. An air surplus from 40-300% and a heat loss from 2-60% of the entire released heat are included in the input data. With this program, 2310 various cases can be computed and 70,000 individual data for 21 different waste compositions can be obtained. By feeding the results of analysis of the waste composition and its presumable variation over a certain period into the computer, all parameters essential for the sizing of the individual parts of the incinerator within a certain determined range can be found.

16494

Akamatsu, Isao, Hiroshi Kamishima, and Yutaka Kimura

DEODORIZATION OF EXHAUST GAS IN KRAFT PULPING. (PART I). ON THE FORMATION OF MALODOROUS COMPONENTS IN KRAFT PULPING. (Kurafuto- parupu seizo kotei haishutsu gasu no mushuka (1 ho): Jokai-chu ni okeru akushu-seibun no seisei ni tsuite). Text in Japanese. Kami-pa Gikyoshi (J. Japan Tech. Assoc. Pulp Paper Ind.), 22(8): 406-410, Aug. 1968. 3 refs.

The formation of malodorous substances, methy mercaptan (MMA) and dimethyl sulfide (DMS), in the process of kraft pulping was studied in two types of Japanese pulp woods: softwoods (red pine, cedar and Japanese cypress) and hardwoods (beech, poplar, cherry and pasania oak). Alkaline (Na2O) and sodium sulfide (NaS) were added to a 400 g dried pulpwood block in an electric autoclave and boiled for 5-1/2 hours at 185 C. Then 5 cc of exhaust gas (raw blow gas) was sent into the cyclone-separator (a cylinder with the diameter of 3 cm and the length of 18 cm) and analyzed for malodorous substances (MMA and DMS) by the use of Yanagimoto GCG-5DH type gas chromatograph. Larger amounts of MMA and DMS, especially MMA, were produced by pulping hardwoods than by pulping softwoods. In pulping the same wood type, the amount of malodorous substances was increased with the increase of cooking hour and temperature, and the concentration of NaS. The white lauan produced the same malodorous substances in quality and quantity as obtained in the pulping of Japanese hardwoods. When the pulping was performed by a batch system, the concentration of DMS was decreased to trace with the depression of pressure in the autoclave.

17344

Knop, Wilhelm

INDUSTRIAL DUSTS AND WASTE GASES. (Industriestaeube und-abgase). Text in German. Wasser Luft Betrieb, 14(1):20-23, Jan. 1970.

The major sources of dangerous and annoying industrial dusts or gaseous pollutants are enumerated. In mines, coking plants, and gas works, dusts develop at the sorting, crushing, and mixing processes. The extent of dust development depends on the water content, the grain size, and the strength of the material. Waste gas and vapor develops behind driers, transportation facilities, and in the quenching of coke. The chemical industry produces the dangerous halogen gases, of which chlorine and bromine are the most harmful. The maximum allowable longtterm emission concentration for chlorine is 0.1 cu cm/cu m air; the short-term value is three times daily 0.5 cu cm/cu m air. Hydrogen chloride develops at the manufacture of dyes. The maximum allowable emission concentration for fluorine is 0.5 cu cm/cu m air. Flourine compounds (in gaseous form or dust) develop in aluminum production, fertilizer manufacture, and at the polishing stations for quartz and glass. With sulfuric acid production in a Claus furnace or in the manufacture of dyes SO2 and SO3 develop. The maximum allowable concentration for these pollutants is 0.2 cu cm/cu m air. Hydrogen sulfide has been limited to 0.1 cu cm/cu m air. It develops in refineries in dye and viscose manufacture. A particularly noxious gas is carbon monoxide which develops in phosphorus and carbide plants. Quarries, cement factories, the ceramic industry, mixers for asphalting highways, iron ore sintering plants, blast furnaces, and foundries all are large contributors of dust and gaseous emissions.

17471

Knop, Wilhelm

INDUSTIRAL DUSTS AND WASTE GASES. (Industriestauebe und-abgase). Text in German. Wasser Luft Betrieb, 14(2):63-66, Feb. 1970. 22 refs.

The most dangerous and annoying pollutants emitted by various industries are enumerated. Steel mills emit primarily iron oxides and fluorine compounds. Half of the original fluorine input is emitted; the other half goes into the slag. The iron oxide emissions, primarily the small particles below 5 micron, form the brown smoke. The non-ferrous metal fabricating and finishing plants emit metal oxides (cadmium oxide). When inhaled, the latter may be extremely harmful. The TLV (threshold limit value) is 0.1 mg/cu m air. In aluminum production, dust-laden waste gases develop, despite the wet process. The aluminum oxide dust content in the rotary furnace is 300-400 g/standard cu m. In electrolytic reduction of aluminum oxide, cryolite also dissociates. As a consequence, hydrogen fluoride and dusts of fluorine compounds are found in the waste gas. The TLV for fluorides is 2.5 mg/cu m; for hydrogen fluoride, 2 mg/cu m. In lead plants 3 to 3.5 cu m waste gases per kg sinter develop in the sintering and roasting station. They contain 1.5 to 5% by volume SO2 and up to 15 g/cu m dust. The dust contains lead, zinc, sulfur, and small amounts of other elements. Considerable amounts of metal vapors develop. In the fly dust of the shaft furnaces, cadmium oxide or sulfate, arsenic, zinc, and thallium compounds may be found. In copper smelting plants, the waste gases contain fly dust and SO2. In zinc refining, fly dust (0.1 g/standard cu m) and SO2 are emitted to the waste gas. In ferro-alloy production, dusts of various kinds are carried along in the waste gases. The waste gas quantity of a 10 MW furnace amounts to 70,000-250,000 cu m/h; the dust content, to 0.25-2.5 g/cu m.

17665

Alov, A. A. and M. N. Mogil'ner

COMPARISON OF HYGIENIC CHARACTERISTICS OF SOME GRADES OF ELECTRODES. (Stravenie gigienichesikh kharakteristik nekotorykh marok electodov). Gigiena Truda i Prof. Zabolevaniya, vol. 8:47-49 Feb. 1964. 2 refs. Translated from Russian. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 6p., Sept. 17, 1969.

A new low-manganese ferroalloy electrode for use in welding low-carbon steel at high welding speeds is compared with other high-duty electrodes with respect to the amount of aerosol generated and the manganese content of the aerosol. As determined by comparative tests, the amount of aerosol given off by the respective electrodes is approximately the same, but the manganese content increases as the proportion of the manganese-containing components in the coating increases. Contamination of air by toxic manganese compounds was significantly reduced by the new electrode whose diameter is 4 mm. The electrode has the same productive capacity as those 7 mm in diameter.

18267

Rohmeder, E., and A. von Schoenborn

INVESTIGATIONS OF PHENOTYPICALLY RELATIVELY FLUORINE-RESISTENT FOREST TREES. (Untersuchungen an phaenotypisch relativ fluorresistenten Waldbaeumen.) Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, Contract No. CPA 22-69-30, Project No. C 2439, 21p., 1968. 10 refs.

A total of 36 spruce trees, which had shown resistance to fluorine-containing pollutants for as long as 40 years, have been investigated for five years to determine (1) whether this resistance was due to genetic factors, better nourishment, more favorable water supply, etc., (2) what gas concentrations can be withstood by forest trees, and (3) if the selected spruces can withstand higher concentrations than other spruces of the same age and some deciduous trees which are known to be more resistant. The results indicate that (1) genetics is a very important factor and (2) forest damage from industrial pollutants can be reduced or eliminated if foresters would cultivate pollution resistant trees in industrial areas.

18268

Rosenberger, G., and H.-D. Gruender

INVESTIGATIONS INTO THE EFFECTS OF FLUORINE IMMISSIONS ON CATTLE IN THE NEIGHBORHOOD OF A HYDROFLUORIC ACID PLANT. (Untersuchunge ueber Fluorimmissionwirkungen bei Rindern im Bereich einer Flussaeure-Fabrik.) Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, Contract No. CPA 22-69-30, Project No. C 2439, 29p., 1968. 10 refs.

During the period of 3.5 years, twelve cows were kept under controlled conditions on a farm located in the emission area of a hydrofluoric acid plant. At the beginning of the test program the age of the cattle ranged from 3/4 to 9 years. The investigations covered the computation of the fluorine intake through the forage, the water and the air as well as the excretion by urine and incorporation in the bones. The state of health and the productivity of the cattle was constantly observed. The fluorine content of the farm-produced forage varied largely depending on the situation of the forage land with respect to the industrial plant. The monthly average of fluorine intake of the cattle varied between 1.0 and 9.5 mg F per kg body weight. All cattle showed symptoms typical for chronic fluorine poisoning, i.e. changes in teeth and bones as well as disturbances in locomotion. No influence of the fluorine intake could be detected on the fertility or on the milk productivity if this was less than 20 liters per day. Calves of cows with chronic fluorosis were not injured but do have an increased fluorine content of their bones.

19027

Meysson, N. and T. Waldenstroem

PRESENT STATE OF THEORETICAL KNOWLEDGE ON RED SMOKE. (Etat actuel des connaissances theoriques sur les fumees rousses). Text in French. Centre Doc. Siderurg., Circ. Inform. Tech., 25(12):2663-2673, 1968. 16 refs.

Red dust emission of the Thomas steel plants were studied from the standpoint of chemical analysis, granulometry, and quantity of dust emitted. The sources of dust were analyzed by evaporation alone and by a combination of evaporation and oxidation. The most satisfying theory thus far developed is that of Turkdogen, Grieveson and Darken, who propose the following improvements: when using air, lower the temperature at the point of impact; when pure oxygen is used, increase the oxygen at the point of impact, so as to cause the rapid formation of an iron oxide inhibiting layer.

19434

Ministry of Labour and Social Welfare, North Rhine-Westphalia, Germany

KEEPING THE AIR PURE IN NORTH RHINE-WESTPHALIA. (Reinhaltung der Luft in Nordrhein Westfalen). Congr. Reinhaltung der Luft, Duesseldorf, West Germany, 1969. (Oct. 13-17.) Translated from German. Belov and Associates, Denver, Colo., 133p., Feb. 11, 1970.

The centers of industrial concentration in North Rhine-Westphalia are also those of population concentration. The close juxtaposition of these concentrations of emittants of air pollutant material and the densely situated population causes extreme problems. The directed measures of the last ten years against the unbearable dust load and the harmful sulfur dioxide emissions have led to considerable improvements. Measurements show an extraordinary reduction of dust and SO2 in the air since 1963. While infringements on the dust limit values were found on 22% of the measurement surface at the beginning of the measurement period with 5% of the measuring surface violating the SO2 limit value, in the year 1968 violations were 5% for dust and 1% for SO2. These successes were predominantly due to severe licensing practices for new industrial plants and improvement programs for existing industries that do the most to determine emission concentrations: steel convertors, ore sintering plants, coking furnaces, foundries, and steam power plants. The experiences of the last few years have shown that the problems of air pollution are subject to change and have a continuous connection with the developments in technology and production in industry. An increase of around 25% to 5 million tons SO2 emissions per year is projected from 1967 to 1975. From 1975 on, the production of electric power, which will then account for 40% of the SO2 emissions, will be considerably influenced by atomic energy; SO2 emissions will first stop their increase and then start to decline. Fluorine, hydro[illegible]as, chlorine, and numerous odor substances will become the focus of attention. The dust problem will no longer be a question of loads due to coarse dust, but dangers to health due to fine dusts. Precipitation measurements will be extended to include concentration measurements. In the coming 10 years, the State will also take an increasingly critical look at emissions from automobiles and domestic heating units. The goal of the State Government is the development of a control system on a regional basis. Data banks will be set up to provide regional data on individual industrial emission sources, as a tool to the development of control programs. This program has already begun in the area of metropolitan Cologne and will soon be extended to the Duisburg/Oberhausen/Mulheim a.d. Ruhr, Essen/Bottrop, Gelsenkirchen/Wanne/Eickel/Bochum, Castrop/Rauxel, and Dortmund regions.

19444

Juentgen, H. and K. H. Van Heek

PROGRESSES MADE IN THE RESEARCH OF PYROLYSIS OF BITUMINOUS COAL. (Fortschritte der Forschung auf dem Gebiet der Steinkohlenpyrolyse). Brennstoff-Chem. (Essen), 50(6):172-178, June 1969. 63 refs. Translated from German. Belov and Associates, Denver, Colo., 28p., May 12, 1970. (Presented at the DGMK Annual Meeting, Salzburg, Germany, Oct. 7-9, 1968.)

Research is reported which deals with new work in the field of coal decomposition at high temperatures (up to 10,000 K), the state of the knowledge pertaining to reaction kinetics of the gas formation during thermal decomposition of coal, and the correlation between bituminous coal analysis and combustion. Through the development of high-energy plasma burners and lasers, experimenters can now perform the thermal decomposition of coal using extremely high temperatures and correspondingly high heating rates. Additionally, differentiating physical instruments for the determination of the products of pyrolysis, new methods for the evaluation of measured data by the use of computers, and new techniques for the heating of coal samples facilitate exact studies of the reaction kinetics of the gas formation during pyrolysis. Discussion is presented pertaining to the thermodynamics of coal at high temperatures, the kinetics of coal pyrolysis, and the correlation of pyrolysis with other reactions occurring during the combustion of individual coal particles.

19899

Sawaya, Tsugio

SURVEY ON THE PUBLIC NUISANCE BY OFFENSIVE ODOR. (Akushu kogai gairon). Text in Japanese. Kuki Seijo (Clean Air - J. Japan Air Cleaning Assoc., Tokyo), 8(2):34-46, June 1970. 12 refs.

Offensive odor as a public nuisance can be classified according to its composition in the following industrial sources: hydrocarbons and mercaptan from petroleum refining; organic sulfur compounds such as mercaptan from paper and pulp factories; and amine and fatty acids from fish meal and rendering factories and stockyards. Odors of each category are explained. While it is well established that olfactory reception is caused by a stimulus given to nerves by gaseous substances or air-borne particulates, the mechanism of the stimulus is not yet known. Odors of industrial waste water are classified into the following, that is, aromatic, free chlorine, disagreeable, earthy, fishy, grassy, moldy, musty, peaty, sweet, free hydrogen sulfide, and vegetable. Weber-Fechner's law, fatique, personal differences, and interference of odors are described. Definitions of threshold and odor concentration are provided. Measuring methods of odor include dilution by air, equilibrium with salt water, and a method used by processing factories to monitor the total amount of odor substances. Physical or chemical methods are available for odor abatement. Scrubbers, condensation by cooling, adsorption by active carbon, and dilution by air are in the physical category, while chemical methods include processing by acid, alkali, chlorine, or ozone, ion exchange, masking, recombustion, and catalytic combustion.

20384

Pflaum, W., Th. Kempf, and D. Luedemann

THE OUTBOARD MOTOR AND WATER POLLUTION. (Der Aussenbordmotorbetrieb und die Gewaesserverschmutzung). Motortech. Z. (Stuttgart), 29(3):85-90, March 1968. 8 refs. Translated from German. 25p., Sept. 23, 1969.

Braking tests, as well as tank and pond experiments, were conducted on mixture-lubricated, two-stroke outboard motors to determine exhaust gas substances which condense in or are absorbed by water. The most disturbing components of the exhaust gas are the heavy hydrocarbons. Their effects and those of other components on underwater plants and animals were studied by chemical and biological tests and by taste checks of fish. The motor tests were performed with new motors or motors past the break-in period. They had nominal powers of 6, 18, and 40 HP and were operated with fuel-to-oil mixtures of 1/25, 1/50, and 1/100. After 350 hours, as a consequence of wear and tear, medium power class motors consumed 10-25% more fuel and emitted more toxic substances. The average data double at idle or full load operations. Any improvement of the motors which leads to a lower fuel and oil consumption would reduce the emission of pollutants to water. Results show that the permissible fuel-to-water ratio should be changed from 1/100,000 to 1/200,000.

20564

Reh, L.

INCINERATION AND THERMAL CRACKING OF LIQUID AND PASTEOUS REFUSE. (Verbrennung und thermische Spaltung fluessiger und schlammfoermiger Industrie-Abfalle). Chem. Ing. Tech. 39(4):165-171, 1967. 22 refs. (Presented at the 128th Dechema Meeting, Frankfurt/Main, April 1, 1968.) Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa. Science Info. Services, 23p.

The following are the decisive factors in selecting the method, the furnace system, and the reaction conditions for incineration or thermal cracking of industrial sludges: combustibility, volatility, and toxicity of the individual components; the water content; the mineral substances; and corrosive compounds. The most common types of furnaces (such as combustion chambers, story of fluidized bed furnaces) are surveyed, and their design, mode of operation, and field of application are discussed. Most incinerator plants use both combustion and thermal cracking. The legal requirements of total residueless combustion of all toxic organic components demand combustion temperatures of at least 800 C in the actual combustion zone of the furnaces. With many residues, this temperature cannot be reached without auxiliary fuel. A rotary burner, spray burner, an atomizing nozzle, a story furnace, and a fluidized bed furnace are illustrated. The fluidized bed incineration with a turbulent layer of inert material may be also used for thermal cracking of waste sulfuric acid from inorganic or organochemical plants. The waste acid concentrated to an acid contents of 45% (including solid substances, mostly sulfates) is pumped into the turbulent layer of sand, heated by an auxiliary burner, and cracked to water vapor, O2, and SO2. The sulfates are converted to oxide, and organic substances are incinerated. The spent hydrochloric acid and iron chloride containing pickling baths are thermally cracked.

20884

Mayaudon, Enrique Marquez

PRELIMINARY SURVEY OF AIR AND WATER POLLUTION BY INDUSTRY IN SEVERAL BORDER CITIES OF NORTHERN MEXICO. (Encuesta preliminar sobre contaminacion industrial del aire y agua en algunas ciudades fronterizas del norte de Mexico). Preprint, 11p., June 1967. Translated from Spanish. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 13p., Sept. 17, 1969.

The following nine cities were briefly surveyed in May 1967: Matamoros, Reynosa, and Nuevo Laredo in the state of Tamaulipas; Piedras Negras in Coahuila; Ciudad Juarez in Chihuahua; Nogales in Sonora; and Mexicali, Tecate, and Tijuana in Baja California. The survey was based on the consumption of raw material and output from various emission sources. Air pollution was found to stem mainly from natural sources (pollen, dust, bacteria); emissions from internal combustion engines were the second largest source. Industry in these areas is in beginning stages, with small plants (fewer than 100 workers) predominating; present plants which may eventually contribute to more serious air pollution problems include petroleum installations, a steel smelting plant, metallurgical, insecticide plants, a brewery, and factories which manufacture construction materials. Brief results of the survey are given for each city.

21887

Franzky, U.

THE USE OF OXIDATION PROCESSES FOR REDUCTION OF ODOROUS EMISSIONS. (Ueber den Einsatz von Oxidationsverfahren zur Verminderung geruchsintensiver Emissionen). Text in German. VDI (Ver. Deut. Ingr.) Ber., no. 149:291-302, 1970. 29 refs.

Thermal waste gas treatment is by far the most efficient method, but also the one with the highest operating costs, for the reduction of odorous emissions from animal rendering, coffee roasting, pyrolysis of beech wood, and foundries. The waste gas is pressed into a combustion chamber where guide vanes impart a rotary movement to the gas. The oil or gas burner is tangentially attached to the cylindrical chamber wall. Waste gases from a coffee roasting plant could be cleaned from 575 mg C/cu Nm to 170 mg C/cu Nm when temperatures in the chamber did not exceed 485 C. Better results are obtained at temperatures between 680 and 800 C, while concentrations of more than 10 g/cu Nm in the uncleaned gas could be reduced to less than 100 mg C/cu Nm at 740 C. Catalytic oxidation has found wide-spread use in the past few years, in which it generally suffices to heat the waste gases to just 350 or 400 C. Thus, costs for energy can be saved. Catalysts with palladium or platinum as active ingredients are used. Efficiencies of 90 to 95% are achieved with this method, but a higher maintenance service is required. Deodorization of the air in a poultry farm and pig sty by addition of ozone was unsuccessful. Better results were obtained in a mink farm by soaking a bed of sand with potassium permanganate solution 100g/12 liter water, 1 liter solution per 1 sq m sand). Mink feces falling onto this soaked bed were deodorized to a large extent. No final results are available as experiments with this method are still in progress.

22077

Hulanicki, Slawomir and Bohdan Glowiak

AN INVESTIGATION INTO THE SPONTANEOUS COMBUSTION OF DUSTS ENCOUNTERED IN THE GRAIN MILLING INDUSTRY. (Badania nad samozapalnoscia pylow wystepujacych w przemysle zbozowym). Ochrana Pracy, 21(5):18-21, May 1966. 11 refs. Translated from Polish. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 11p., Oct. 24, 1969.

A study was conducted on the spontaneous combustion of flour dusts or dusts created in the course of its production. The spontaneous-combustion temperature of flour dusts and flours were determined by the Swietoslawski and Roga method and by the Hulanicki and Glowiak method. The device used to determine the self-ignition temperature of the dusts is described. Induction times were determined for all dusts at temperatures of 300 C, 320 C, 340 C, and 360 C, and their logarithms were plotted as straight lines. The dusts can be separated into two classes with respect to the ease with which they spontaneously burn: dusts from rye, wheat, and barley flours and dusts that are separated in the grinding operation, with a maximum safe temperature of 128 C; and dusts from the grain cleaning process, which are difficult to ignite, with a maximum safe temperature of 220 C. The spontaneous combustion temperatures of all the dusts which were studied by the Swietoslawski-Roga method vary within the range of 250-275 C. This range is hazardous for all operations that involve grain and flour dusts. The curves of temperatures of self-ignition vs induction times make it possible to determine self-ignition temperatures for any arbitrary induction time or to state how long it will take dust at a given temperature to reach the self-ignition point. (Author conclusions modified)

22579

Wozniczek, Henryk

AIR POLLUTION BY MOTOR CAR EXHAUST GASES. (Zatrucie powietrza przez spaliny samochodowe). Ochrona Pracy, 21(5):14-17, May 1966. 16 refs. Translated from Polish. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 12p., Dec. 16, 1969.

Components from motor vehicle combustion gases are discussed in terms of concentrations emitted and the symptoms which they produce. Narcotic properties of saturated hydrocarbons increase with an increasing number of carbon atoms in the molecule, while all hydrocarbons mixed with air in suitable proportions form explosive mixtures. Hydrocarbon vapors above C5 do not require high concentrations, and a concentration of 1 mg/liter is sometimes sufficient to cause dangerous effects in the human organism in a period of a few minutes. Ethylene, propylene, butylene, hexylene, and heptylene induce almost the same disease symptoms as hydrocarbons of the paraffin series. A permissible concentration limit of 0.1 mg/liter is recommended for these unsaturated hydrocarbons of the ethylene series. Diolefins act on mucous membranes in the gaseous or vapor state. Unsaturated hydrocarbons of the acetylene series oxidize more readily than hydrocarbons of the paraffin and olefin series, and are able to very easily attract atoms, atom groups, and particles from other compounds to their molecules. Fatty acids and their anhydrides act destructively on tissues, while formaldehyde is already able to lead to chronic intoxication at a concentration of 0.02-0.07 mg/liter. Aldehydes induce diseases of the respiratory tract, liver and kidney diseases, and diseases of the eyes and skin. Pure ketones produce diseases of the respiratory tract, the eye protective system, and diabetes and anemia. The human organism can tolerate a maximum of 0.01% CO by volume on continuous action for 8 hours daily. Intoxication causes loss of consciousness, convulsions, breathlessness, and asphyxiation. Swelling of the lungs occurs in severe cases of intoxication from nitrogen oxides, while sulfur dioxide acts similarly as a powerful irritant, especially on the mucous membranes. Gasoline vapors induce diseases of the respiratory system, nervous system, and the protective system of the eyes. Toxicity of gasoline vapors increases with increasing CO content in the mixture, and mental disturbances are among the chief symptoms of acute tetraethyl lead intoxication.

23022

Solntsev, S. S.

COMPUTATIONAL METHOD OF DETERMINING FLUORINE BALANCE DURING ALUMINUM ELECTROLYSIS. (Raschetnyy metod opredeleniya balansa ftora pri elektrolize alyuminiya). Text in Russian. Tesvetn. Metal., 40(2):59-62, 1967. 8 refs.

The following quasiempirical formulas for fluorine loss during electrolytic production of aluminum are presented: 1) loss with exhaust gases as a function of cryolite content of the electrolyte and electrolyte temperature; 2) loss with fettlings as a function of service interval; 3) loss in the form of CF4 as a function of the number of anode effects, duration of anode effect, and % yield in terms of current; 4) mechanical loss as a function of the fluoride content of the raw material; and 5) loss with the coal ash. Fluorine loss through exhaust gases is reported for three installations and ranges from 18.97 to 25.63 kg/t. It is estimated that cooling the process by 5 degrees C will reduce fluorine consumption by 0.2 kg/t, while increasing the cryolite ratio by 0.1 will affect approximately a 3 kg/t savings.

23210

Surovikin, V. F. and L. S. Kazakov

STUDY OF THE PROCESS OF FORMATION OF CARBON BLACK PARTICLES DURING DECOMPOSITION OF HYDROCARBONS. Gaz. Prom., 12(8):40-46, 1967. 14 refs. Translated from Russian. Foreign Technology Div. Wright-Patterson AFB, Ohio, Translation Div. 14p., Jan. 8, 1970. CFSTI, DDC: AD 702847

The process of formation of carbon black particles during decomposition of hydrocarbons in an industrial reactor can be described by the Semenov equation for branched chain processes with quadratic breaks in the chain. The specific surface of the carbon black can be determined by theoretical calculations according to the technological parameters of its manufacture. The heating up and evaporation of hydrocarbon raw material, and also the formation and growth of carbon black particles, occupy (2-3) times 10(minus superscript 3)s in an industrial reactor with gases moving at a speed on the order of 300-400 m/s in the zone in which they are mixed with hydrocarbons. Atomization of the hydrocarbon raw material by high-temperature gases from the complete combustion of the fuel at a high relative rate of motion ensures that the raw material will be heated at a high rate. In this process, the magnitude of the specific surface of the carbon black depends on temperature and hydrocarbon concentration in the reaction gas. The temperature of the gases in the reaction chamber of an industrial reactor is not consistent along its length. Due to exothermic reactions, the temperature rises rapidly in the initial zone. It achieves the maximum at the moment of total consumption of oxygen, then is reduced by exothermic reactions.

23580

Reinhard, H.

FLUORINE DAMAGE IN THE LOWER FRICK VALLEY. (Die Fluorschaden im unteren Frichtal). Schweiz. Arch. Tierheilk., 101(1):1-4, 1959. (Presented at the Swiss Veterinary Society, General Convention, Brunnen, 1959.) Translated from German. Belov and Associates, Denver, Colo., 5p., July 10, 1970.

Even though the only aluminum produced in Germany today is manufactured by an electrolytic method, fluorine emissions are still 500 kg per day. In the area of one plant, the quantity of fluorine sedimented per acre in 1956 amounted to approximately 7 kg at 300 m from the plant, decreased rapidly to 0.9 kg at 700 m, and then decreased slowly with increasing distance. Severe clinica phenomena have been observed on vegetation at quite distant locations and can be attributed only to airborne fluorine. Moreover, feed plants (hay and grass) have been damaged, even when their fluorine levels were below those considered toxic by most authors.

24096

Doorgeest, T.

PAINT AND AIR POLLUTION. (Verf en luchtverontreiniging). Text in Dutch. T. N. O. Nieuws, vol. 25:37-42, 1970.

Dutch paint manufacturers are well aware of the fact that application of the products of the paint industry does contribute to air pollution. This awareness has resulted in a joint investigation by paint manufacturers and TNO into the contribution of paint producers and paint users to air pollution in the Netherlands. From information received mainly from members and co-members of the Vereniging Voor Verf-Research (Dutch Society for Paint Research) it was calculated that paint producers and paint users are together responsible for approximately 0.1% of the harmfulness of air pollution in the Netherlands. Moreover the conclusion was drawn that the percentage mentioned will decrease slowly in the coming years. (Author abstract modified)

25056

Ishii, Kazuo, Matsuoki Okuda, Mutsuo Koizumi, Tadahiro Machiyama, Katsuya Nagata, and Noboru Sugimoto

HIGH PERFORMANCE INCINERATION OF SEWAGE SLUDGE. PART II. INCINERATOR WITH SLAG-TAP FURNACE. (Konoritsu no gesui odei shokyaku sochi ni kansuru kenkyu. ni. Yukaishiki odei shokyaku sochi). Text in Japanese. Nenryo Kyokaishi (J. Fuel Soc. Japan, Tokyo), 49(521):674-682, Sept. 20, 1970. 7 refs.

A new type of incinerator with a slag-tap furnace for dewatered sludge consists of an atomizing feeder of sludge, a heat exchanger, an air preheater and a cyclone dust collector. The air-jet type sludge atomizer, referred to in Part I of the article, and a heavy fuel oil burner are placed at the top of the furnace. Refractory materials which are packed in the furnace are suspended by five water-cooled tubes with refractory coating and are heated by firing fuel oil. Dewatered sludge is fed in particulate form and burned immediately when it gets in contact with the high temperature, high speed combustion gas of the fuel oil. Ash in the sludge is melted into slag and flows down into a slag pit through the bank of refractory materials. The incinerator system has the following merits. dustless flue gas is emitted from the furnace, because the ash in sludge is melted into slag at the bank of refractory materials; flue gas is odorless because of high temperature combustion; and the incineration plant can be compact in size and still possesses high performance. This type of incinerator is used more effectively for dewatered raw sludge than for dehydrated sludge, just as in the case of the AST method, since dewatered sludge contains more water and is more convenient for transportation and dispersion. Further, since dewatered raw sludge has not gone through digestion, it contains more organic matter and emits higher heat. The system is applicable to not only sewage sludge, but also for burning sludge in factory effluents which hardly contains any flammable matter, or the sludge which is especially high in water content. The system is only a small test incinerator, with only 100 kg/h capacity. After more experience is gained in taking out melted ash and in testing durability of the incinerator, more problems will be solved.

28494

Gorodinskiy, S. M., E. I. Semenenko, G. A. Gaziyev, Ye. I. Kosterina, O. N. Shevkun, and T. G. Ivanova

SANITARY AND CHEMICAL STUDIES OF SOME POLYMERS. Space Biol. Med. (English translation from Russian of: Kosmich. Biol. Med.), 4(4):17-26, 1970. 4 refs. NTIS: JPRS 51641

To ascertain their suitability for use in pressurized manned chambers, various polymers were placed in an enclosed pressurized chamber and toxic compounds in their gas emanations were measured. The studies were conducted at temperatures up to 200 deg at reduced oxygen pressure (0.2-0.4 atm), and at atmospheric pressure. More than 25 materials were tested, including those based on polyvinyl chloride, caprolactaum, polycarbonate, polyurethanes, natural and synthetic fibers, rubbers, sealings, glass plastics, and plexiglass. The most toxic of these materials were glass plastics and sealings; the least toxic were rubbers and caprolite. The hygienic properties of polymers can be improved by vacuum processing, addition of stabilizers, heating, and washing with water. (Author abstract modified)

28781

Yoshikawa, H., Y. Takabayashi, H. Osaka, T. Hasegawa, and S. Hirao

INVESTIGATION OF SMOKE IN GLASS FURNACES. (Garasu yoyuro no baijin chosa). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 5(1):183, 1970. (Proceedings of the Japan Society of Air Pollution, Annual Meeting, 11th, 1970.)

Smoke from fusion furnaces of glassware manufacturing plants was investigated with respect to dusts, sulfur oxides, air ratio, and penetration rate. The concentration range for dusts was 0.13-0.21 g/N cu m. For a factory manufacturing glass parts for optical instruments, the average was 0.46 g/N cu m. For a thermos manufacturing factory, the average was 0.66 g/N cu m. Since the process involves very high temperatures for the production of hard glass, the amount of dust decreases very rapidly after the operation has begun. Ways of preventing pollution include recombustion of waste gas at a high temperature, maintaining the viscocity of the fuel by adding low-viscocity fuel such as kerosene, and avoiding drastic cooling of the furnace.

31616

Kalyuzhnyi, D. N., L. M. Volova, and E. S. Turetskaya

AN INVESTIGATION OF ATMOSPHERIC AIR WHEN COKE IS QUENCHED WITH PHENOL SOLUTIONS FROM COKE-CONVERTING PLANTS. (Issledovaniye atmosfernogo vozdukha pri tushenii koksa fenol nymi vodami koksokhimicheskikh zavodov). Gigiena i Sanit., 13(5):11-15, 1948. Translated from Russian. Scientific Translation Service, Inc., Santa Barbara, Calif., 9p.

The use of sewage by coke-conversion plants for coke quenching, insofar as it can be judged from the concentration of phenols and hydrogen sulfide in the air, encounters no objection from the sanitary and hygienic point of view as long as the sewage undergoes a preliminary purification process extracting oils and resins from it.

31882

Blokker, P. C.

AIR POLLUTION BY THE OIL INDUSTRY. (Luchtbezoedeling door de olie-industrie). Text in Flemish. Meded. Vlaam. Chem. Ver., 32(6):203-212, Nov./Dec. 1970. 14 refs.

The main potential sources of air pollution from the petroleum industry, excluding the petrochemical industry, are given. The emissions are compared with those from power stations, domestic fuel, and motor traffic. Emissions of nitrogen oxides, hydrocarbons, carbon monoxide, and particulates from the petroleum industry are low in comparison with those arising from other sources. The industry's most important pollutants are sulfur dioxide and odorous gases. Dispersion from high stacks is often an effective means of solving local pollution by sulfur dioxide. For odor abatement, prevention is the best method; examples are given. The problem of abatement cost and norms are briefly discussed. Where health is not impaired, the aim should be a low cost/benefit ratio. The industry is not averse to reasonable norms provided that the level and maintenace are similar in different countries. (Author abstract modified)

34101

Yanagihara, Shigeru

TWO-CYCLE GASOLINE ENGINE EXHAUST GASES. (2-Saikura gasorin kikan no haiki gasu). Sangyo Kogai (Ind. Public Nuisance), 4(11):683-690, 1966. Translated from Japanese. Translation Consultants, Ltd., Arlington, Va., 20p.

At the present time, two-cycle gasoline engines are clearly less advantageous than four-cycle engines principally because their exhaust gases contain large quantities of emitted hydrocarbons. In some ways, however, two-cycle engines are mechanically superior. The construction and characteristics of two-cycle engines are discussed, as well as exhaust gas composition, afterburners, and fuel injection. As a general rule, it is possible to sustain a flame reaction throughout all operating limits including lean air-fuel ratios, if the temperature of the reactants is kepy high by utilizing a heat exchanger.

36533

Shcherbina, E. I., T. A. Efimova, A. E. Tenenbaum, L. I. Mikhalskaya, and V. A. Astakhov

POTENTIOMETRIC DETERMINATIONS OF THE GROUP COMPOSITION OF SULFUR COMPOUNDS PRESENT IN STRAIGHT-RUN GASOLINE FRACTIONS. J. Appl. Chem. (USSR) (English translation from Russian of: Zh. Prikl. Khim.), 44(7):1606-1610, July 1971. 8 refs.

A potentiometer with a silver sulfide indicator electrode and a silver chloride reference electrode was used to determine elemental sulfur, mercaptan sulfur, disulfide sulfur, and sulfide sulfur in straight-run gasoline fractions. Test results are presented in tables and graps that demonstrate the suitability of the method for sulfur determinations over a wide concentration range. As determined by series of parallel analyses, accuracy of the method is high.

B. CONTROL METHODS

00562

E. Hunigen and W. Prietsch

THE ELIMINATION OF NOXIOUS SUBSTANCES FROM INTERNAL COMBUSTION ENGINES. Probleme und Losungswege der Schadstoffbeseitigung bei Verbrennungsmotoren. Technik (Berlin), 21(6):377-383, June 1966.

Control of air pollution from internal combustion engine is reviewed. A table is given of maximum permissible concentrations of various components of exhaust gases for both Germanies, the USSR, and USA. The review emphasizes methods of measurement of various pollutants.

01759

K. Kitawaki

HYDRODESULFURIZATION OF HEAVY OIL. Nenryo Kyokaishi (J. Fuel Soc. Japan, Tokyo) 45, (471) 495-500, July 1966.

Catalytic hydrodesulfurization of atmospheric/reduced pressure distillation residue of crudes is described. Test results of this process as determined in the USA by Gulf Research are cited to show its economic feasibility. The author points out that little work is being done in this field in Japan, and his references are to western literature.

02024

W. Kohler

(METHODS FOR THE ABATEMENT OF AIR POLLUTION CAUSED BY CEMENT PLANTS.) Verfahren Zur Verminderung Der Durch Die Zementindustrien Verursachten Luftverunreinigungen. Proc. (Part I) Intern. Clean Air Cong., London, 1966. Paper Iv/12). pp. 114-6.

With the increasing cement consumption the production plants of the cement industries are on the whole fully employed. To some extent they were enlarged by new plants in order to satisfy the demand for cement. According to temperature, contents and components of dust, the quantities of air or gases escaping from the production plants are dedusted by various dust extraction plants, e.g. centrifugal dust-extractors, fabric filters, gravel-bed filters, electric dust extractors, so that a vast reduction of the dust emissions will be reached. To produce one ton of cement some 2.8 tons of raw materials, gypsum, clinker, and coal of rough or fine quality must be crushed to powder. During the various stages of production the fine crushed material always mixes with cold air or hot gases, and this necessitates a further separation. The removal of the fairly considerable dust contents of raw gases and the observance of the required limits of emissions not only are diccicult technical task butr also cause considerable financial costs by capital expenditure for new plants, their management and maintenance. (Author abstract)

02032

K. Schwarz

(DUST EMISSIONS FROM COAL-FIRED BOILERS IN THE FEDERAL REPUBLIC OF GERMANY.) Die Staubemissionen Kohlegefeuerte Dampfkesselgrossanlagen in Der Bundesrepublik Deutschland. Proc. (Part I) Intern. Clean Air Cong., London, 1966. (Paper V/8). pp. 136-41.

In the Federal Republic of Germany, rigorous scales were evolved for the supervision of emissions from industrial plants by the Federal Regulations issued in 1959 in the interests of clean air, and by the technical regulations of 1964, which set limits for these ('Technical Directions for Clean Air, TAL'). This applies in particular for the requirements which were placed on the emission of dust from large coal-fired boilers particularly when the fuel has a high ash content. Results of numerous experiments on large, electric dust removers for bituminous coal and brown coal-fired boilers - carried out by the Technical Supervisor Groups in Essen and the Rheinland, show the developments over the past few years towards ever higher separating achievements. Effects of various factors, in particular the properties of the fuel and the combustion conditions , were visible on dust properties and separating results. The limits reached today in this sector are indicated. (Author abstract)

02130

R Eberaneberhorst

(ENGINE COMBUSTION AND ITS EXHAUST GAS PRODUCTS AS A PROBLEM OF HIGH INCIDENCE). Die Motorische Verbrennung und ihre Abgasprodukte als Haufigkeitsproblem. ATZ (Automobiltechnische Zeitschrift) (Stuttgart) 68(8):263-268, Aug. 1966.

The increasing incidence of gasoline engines necessitates reducing the air pollutants from exhaust gas by 40% within the next 10 years. The influence of engine operation on the emission of carbon monoxide, hydrocarbons and nitrogen oxides is described, e.g., in high gear, while changing gears and speeds (7-mode California test), and in neutral. Limiting values for emissions dependent on motor size and normal usage are suggested. Methods to reduce exhaust gas pollutants included fuel injection systems to replace carburetors and controlled turbulence techniques.

02931

D. Korol

SEPARATION OF PYRITES FROM COALS. (Wydzielanie pirytu z wegli.) Prace Glownego Inst. Gornictwa (119)1-12, 1952. CFSTI: 60-21277

The objects of this investigation were to study the possibility of separating by means of mechanical processing at least part of the sulfur contained in Polish coals; to earmark those collieries which possess S in such quantitities as to make feasible an industrial separation of pyrite from coal; to establish the technological approach. Only pyrite coal is considered herein. The use of the sulfur obtained from pyrites by the chemical industries is considered most desirable. Products totalling 69 from 26 collieries were examined as follows: (1) by jigging; (2) by enrichment of products on concentrating tables (considered the most appropriate approach); (3) enrichment by flotation, mostly applicable to slurries. It was established that, by treatment on concentrating tables, pyrite concentrates of S content above 40% can be obtained from the product of certain collieries; in other collieries, the concentrates separated contained from 35 to 40% S, or lower. Priority should be reserved for the construction of small preparation plants, equipped with tables, attached to collieries which yield, without additional processing, rich pyrite concentrates.

03045

H. Mori

HANSHIN WET TYPE DUST COLLECTORS. Clean Air Heat Management (Tokyo) 15, (5) 5-11, May 1966

There are three models of Hanshin Wet Type Dust Collectors for collecting different kinds of dust and they all operate on the same principles. Contaminated exhaust gas is forced into a water tank equipped with turbulance control plates through nozzles at a high speed. The gas is cleaned while in contact with the water. The HJ model is for collecting fine particles from such materials as sand, cement, activated carbon and brick. The typical collection efficiency for various particle size distributions is approximately 99%. The HJS model is designed for use with oil and coal burners. The mechanics of this model are the same for the HJ models, but the HJS model requires the addition of a sludge tank. The concentration of soot in the exhaust gas is reduced by a factor of two. Appropriate sizes of HJS models for different boiler sizes are tabulated. HJG models are designed for the treatment of gaseous contamination in exhaust gas. They have the same structure as HJ and HJS models except that a de-mister is added at the top of the tank. The absorption efficiencies for H2S, Cl2, SO2 and NO2 are tabulated. The efficiency of 98.5% is obtained for H2S by addition of NaOH to the tank water.

04798

H. J. Ochs

PURIFICATION OF AIR IN ROLLING MILLS. Umluftreinigung in Walz-Betrieben. Metall. 19, (4) 348-51, Apr. 1965. Ger.

The utility of electrostatic precipitation in the working premises of a rolling mill is discussed in connection with cleaning of oily fogs and emulsion fogs generated by rolling processes. From an economic point of view the considerable costs for the installation of an electrostatic precipitator can be amortized in a relatively short time Its simple maintenance, safety of operation and effectiveness should be considered.

05448

E. Junker

ELECTROSTATIC FILTERS FOR EXHAUST GAS CLEANING AT PRESSURE DIE CASTING MACHINES. Electrofilter zur Abluftreinigung an Druckgiessmaschinen. Giesserei 54(6) 152-4, Mar. 16, 1967. Ger.

Substances used for sizing and lubricating in pressure die casting such as mineral oils and aluminum powder cause considerable air pollution hazards to the operators. Therefore, effective exhaust hoods capable of removing dust and mist must be employed. Because suspended particles of fats and oils have a tendency to condense in the exhaust pipes creating a fire hazard, the dust removal plant must be close to the hoods. While tests using dry and wet prefiltering brought no satisfactory results, electrostatic filters of the two-zone type (13 and 6.5 kv) were successfully employed. Once a week the aluminum plates charged with dirt are cleaned in hot water (containing a 7.5% detergent solution) agitated by jets in about 4 min. Complete interchangeability of the parts to be cleaned greatly facilitates servicing a number of die casting machines.

05464

K. Wagener

(POSSIBILITIES FOR EXHAUST AIR CLEANING IN PRESSURE DIE CASTING FOUNDARIES.) Moglichkeiten zur Abluftreinigung in Druckgiessereien. Giesserei 54, (6) 150-2, Mar. 16, 1967. Ger.

Substances used for sizing and lubricating in pressure die casting , such as mineral oils and aluminum powder cause considerable air pollution hazards to the operating crew. Therefore, effective exhaust hoods with subsequent dust and mist removal must be employed. Because suspended particles of fats and oils have a tendency to condense in the exhaust pipes creating a fire hazard, the dust removal plant must be close to the hoods. Where this is not possible, pre-filtering by wire nettings built into the hoods proved advantageous. Forty-five per cent of the pollutants, mostly the coarser materials like aluminum, dust, and fats are retained by the netting while substances such as oil and soot reach an electrostatic filter. Extensive test on the system, performed in southwest Germany, indicated a 98% efficiency. Venturi-washers could also be used instead of electrostatic filters but wet-washers (wet cyclones) proved insufficient.

06116

J. Coutaller and C. Richard

IMPROVEMENT OF ELECTROSTATIC DUST REMOVAL BY SO3 INJECTION. Amelioration du Depoussierage Electrostatique par Injection de SO3. Pollut. Atmos. (Paris) 9, (33) 9-15, Mar. 1967. Fr.

The problems involved in the use of SO3 to improve the efficiency of electrostatic precipitators for the removal of fly ash from the combustion gases of large power plants is discussed in reference to large-scale field tests at Criel and Blenod in France. The health and the problem of welding containers that have contained SO3 are discussed. It was found that when 17 ppm of SO3 was injected into the gas stream before the electrostatic precipitator, the results with two units were equal to that obtained with three electrostatic precipitators. The test which showed the best results with a yield of 98.5% with 250 MW on the precipitator used 47 kg of SO3 per hour or more than a ton a day. The improvement was equivalent to a gain in yield of 4.5%. However, there are difficulties in protecting people and the cost of installation is high. It is premature at this point to generalize as to whether the use of SO3 is economical as a substitute for an electrostatic unit in a group of units. If further tests verify the present work, the use of SO3 could be considered a valuable, but difficult method of improving the efficiencies of electrostatic precipitators.

06280

Folke Hedlund, Gustav Ekberg, Sten Erik Mortstedt

DIESEL EXHAUST GASES. INVESTIGATION WITH PROPOSALS FOR ACTION. (Communications Dept., Stockholm, Sweden, Guidance Group Concerning Development Work in the Field of Motor Vehicle Exhaust Gas, Sept. 1967. Translated from Swedish. Joint Publications Research Service R-8943-D, 74p., Dec. 12, 1967. 27 refs.

Diesel exhaust emissions and methods of controlling these emissions in Sweden are reviewed. The diesel engine differs from the gasoline engine in several respects, which have a decisive influence on the pollution it emits. It uses a fuel that is less volatile than gasoline. It normally works with a higher excess of air (leaner mixture) and the devices for feed and ignition of the fuel are quite different. Due to the discharge by individual vehicles of dense smoke and by the discharge of foul-smelling substances they have been pointed out by the public as qualified air polluters. Poor maintenance of the engine or intentionally wrong pump adjustments can result in the giving off of such dense smoke that this can constitute a hazard for overtaking vehicles due to impaired or obscured visibility. Diesel engines can give off various types of smoke. One type is the heavy load smoke, which arises through load on a hot engine. Exhaust gases from diesel vehicles, especially under certain driving conditions, contain substances that are irritating to eyes, nose and throat. These include: oxides of nitrogen, hydrocarbons, polycyclic aromatic hydrocarbons, carbon monoxide and sulfur dioxide. The smoke from a diesel engine can be limited by various measures, undertaken on the engine or the fuel pump, the fuel, and finally on the exhaust gases. Regular maintenance of the engine is necessary to keep the smoke values at the lowest possible level. Current and proposed regulation of diesel exhaust emissions are discussed.

06783

G. Funke and H. Fischer

(RESULTS OF DUST MEASUREMENTS ON CEMENT KILNS.) Ergebnisse von Staubmessungen an Zementofen. Zement-Kalk-Gips (Wiesbaden) 20, (4) 146-51, Apr. 1967. Ger.

In 1966, the Research Institute of the Cement Industry in Germany performed 270 measurements at dust collection installations in 37 cement plants. The results, pertaining for the most part to electrofilter installations, are summarized in 6 tables. The individual measurement conditions are reported. The measured values provide a survey of the present position of dust collection technique for cement kilns. The limiting values at present specified for the dust content of the cleaned gas are indeed usually conformed to if the dust collection plant is correctly designed, but at the present stage of technical development troubles still often occurr which impair the collection efficiency. Conditioning of kiln exit gases by water spraying, especially in the case of rotary kilns with suspension preheaters in direct operation, continues to present difficulties. The prevention of the infiltration of 'false' air and constantly applied proper maintenance contribute much to ensuring that the dust collectors maintain the required collection efficiency under continuous working conditions.

07362

Feist, H. J.

ELIMINATING ODORS BY CATALYTIC COMBUSTION. ((Die Geruchsbeseitigung durch katalytische Verbrennung.)) Text in German. Stadtehygiene (Uelzen/Hamburg), 16(3):55-61, Mar. 1965. 11 refs.

With the rapid growth of the chemical industry, air pollution by odors has also increased. Catalytic oxidation and reduction offer possibilities for an economic solution of the problem. The principles of catalytic reactions are described. In a table the properties of four catalysts are compared with each other. These catalysts are: platinum on metal, platinum-palladium on ceramics, copper-chromium on aluminum oxide, and platinum on ceramics. The effectiveness of a catalyst depends on the gas mixture, the temperature, the type of catalyst, and the ratio: volume of gas/hour/volume of catalyst. The heat generated by the catalytic process is usually used to preheat the gas before it enters the catalyst. If the concentration of combustible substances is sufficient, steam may be produced in addition. An example is quoted where 47,000 cu. m. gas per hour with a latent heat of 400 kcal/cu. m. produce 31 tons of steam per hour. The equipment pays for itself in 2 1/4 years. For gases of low heat content, catalytic combustion under increased pressure is advantageous. Most economical is a gas turbine which compresses the gas and, after it has passed the catalytic chamber, uses the hot cleaned gas. The use of a gas turbine is recommended for gas volumes of more than 100,000 cu. m./hr, if measures for air pollution control become necessary.

07530

H. O. Hettche, H. Schwarz, W. Luhr

WASTE GAS CLEANING IN THE ANIMAL PRODUCTS INDUSTRY - PART I. (Abgasreinigung in der Industrie Tierischer Produkte - Teil I.) Text in German. Stadtehygiene (Uelzen/Hamburg), 15(5):103-104, May 1964.

Complaints by the neighborhood of a fish processing plant about annoying odors led to a series of experiments to determine an economical way for cleaning the plant's waste gas. Drying of fish meal can be done in three ways: 1) the azeotropic method with perchloroethylene which is rather expensive; 2) steam drying; and 3) fire drying. The waste gas from steam drying is rich in amines, and from fire drying rich in sulfur dioxide. Both carry large amounts of reducing substances. Spraying the gas in two steps brought satisfying results. In the first stage the waste gas is sprayed with a base and in the second stage with diluted sulfuric acid. In this stage agglomeration of aerosols from the drying fish meal occurred which were to a large degree responsible for the bad odors. This two-stage washing method, together with the 1:1000 diluting effect of a high chimney were sufficient to eliminate the obnoxious odors from the fish meal plant.

07531

H. O. Hettche, H. Schwarz, W. Luhr

WASTE GAS CLEANING IN THE ANIMAL PRODUCTS INDUSTRY - PART II. (Abgasreinigung in der Industrie tierischer Produkte - Teil II.) Text in German. Stadtehygiene (Uelzen/Hamburg), 15(7):155-158, July 1964.

Waste gas from the production of fish meal contains up to about 200 mg/cu m of ammonia, 15 mg/cu m of substances containing sulfur (H2S and mercaptans), 5 to 10 mg/cu m of carbonylic compounds, and sulfurous and organic acids up to 100 mg/cu m. There are also substances which are reduce by potassium permanganate, of the amount of 1000 to 1500 mg/cu m. Such waste gas could be successfully deodorized by a three- stage scrubber. In the first stage the waste gas is cooled below 30 degrees C by spraying it with water in a jet spray tower. The second tower used 2% NaOH and sodium bleach, and the third tower sprayed 0.5% H2SO4. Cooling below 30 degrees was necessary to reduce the concentration of organic (mostly oily) compounds. Results of other experiments in this series are also reported in the form of three tables.

08129

V. G. Matsak, A. S. Slutsker

PROCEDURE FOR INVESTIGATION OF THE EFFICIENCY OF DUST-ABATEMENT EXHAUST SYSTEMS. In: A. A. Letavet and Ye. V. Khukhrina (eds.) Methods of Studying Industrial Dust and the Incidence of Pneumoconioses. (Metody izucheniya proizvodstvennoy pyli i zabolevayemosti pnevokokoniozami.) Leningrad, Meditsina Publishing House, 1965, 123p. Translated from Russian. Clearinghouse for Federal Scientific and Technical Information, Washington, D. C., Joint Publications Research Service, TT 66-30952, p. 66-96, March 11, 1966. 6 refs.

One of the most important tasks of control of the efficiency of ventilation devices is the obtaining of reliable and accurate results of determination of dust concentration in the air flow, moving through the air duct. Up to the present time the direct method of dust concentration determination is the most frequently used method and consists in aspirating and filtering of a portion of the flow through some kind of analytical filter. This method provides for the measurement of the volume rate (flow rate) of the aspirated air, the length of sample taking, and the amount of the settled-out dust. With these values the dust concentration, expressed in grams (of milligrams) in one cubic meter of air is calculated. Indirect methods, based on the measurement of the indexes of the physical properties of the dust flow, so far are not widely used. In the determination of dust content of the ventilation flow, the samples are taken by means of a dust-drawing tube, introduced into the air duct. An important condition for obtaining correct results here is the observance of equal rates of movement of air in the aspirating opening of the dust-intake tube and in the investigated air flow (the rule of isokinetic condtions of sample taking). Thus, prior to taking samples for the dust content in the air ducts the rates of the air movement in them is measured. The problems concerning the technology of measuring the air flow rates are sufficiently expounded in special reference and instruction literature, and are stated here very briefly. Investigations of the dust content in ventilation system air ducts, estimate of the efficiency of dust collecting devices, and various mathematical considerations are discussed.

08467

Vogel, H. E.

THE ANNUAL MEETING OF THE SWISS ASSOCIATION FOR FLOOD PROTECTION AND AIR HYGIENE (VGL). ((Die Jahrestagung der Schweizerischen Vereinigung fur Gewasserschutz und Lufthygiene (VGL).)) Text in German. Wasser Abwasser (Munich), 108(38):1088-1089, Sept. 1967.

A report is given in which the 'Purity of the air in the vicinity of the Shell refinery at Cressier' is reviewed. There are four plants in the vicinity of Cressier which may pollute the air: a cement factory, a refinery, a thermal paper mill, and a plant for the drying of potato flakes. In the refinery, several steps are taken to ensure air purification: the use of floating covers to prevent vaporization of volatile compounds from drying pans, siphoning off and burning of noxious vapors, preparation of odorless sulfur from H2S and mercaptans, and the use of refinery gas to limit sulfur dioxide emissions. In contrast to water pollution, the area of air pollution may entail psychological problems such as fears of sickness from breathing noxiuos odors, of impaired breathing, or even smothering.

08594

Gamer, Carl H. and Martinus Hus

ECONOMICS OF HYDROGEN PRODUCTION AND HYDROTREATING. (Wirtschaf- liche Herstellung von Wasserstoff und Hydrotreating.)) Text in German. Erdoel Kohle (Hamburg), 20(7):482 484, July 1967. 17 refs. (Presented at the Annual Meeting, German Assoc. for Mineral Oil Science and Coal Chemistry and the Austrian Society for Petroleum Sciences,Munich,Oct. 138 1966)

The increased upgrading of oil refinery processes--requiring additional sources of hydrogen--is advocated for Germany. Despite added costs, such steps should result in financial gains of over 60 percent; moreover, the probable future limitations of sulfur content in fuels by means of governmental air pollution control regulation also suggests increased use of such hydrogen refining processes. Other technical advantages of the use of hydrogen production facilities are cited. The conditions and costs of hydrogen production for three different processes (steam methan pyrolysis, steam naphtha pyrolysis, partial oxidation) are tabulated. In the future it may be desirable, as an air pollution abatement measure, to combine thermal power plnats with refineries so as to convert the heating oil to heating gas through partial oxidation= should this actually become an accepted practice, considerable added savings in hydrogen production--hence in upgraded refinery processes--will be realized.

08811

Morishima, Naomasa and Yoshida Tetsuo

DUST COLLECTION ON ATOMIZED DROPLETS--CALCULATION OF COLLECTION EFFICIENCY WITH CONSIDERATION OF DROPLET SIZE DISTRIBUTION. Text in Japanese. Kagaku Kogaku, 31(11):1114-1119, Nov. 1967. 6 refs.

The efficiency of the dust collection mechanism in wet collectors, which remove dust from the atmosphere by water droplets, has heretofore been obtained from the mean diameter of the water droplets and the dust. However, since the particle size of droplets and dust varies widely, consideration of particle size distribution becomes necessary. A mathematical analysis was made to determine the influence of particle size distribution of water droplets on the impaction or diffusion collection efficiency, assuming the use of a Venturi scrubber dust collection mechanism. The results are: 1) as the range of particle size distribution widens, the impaction efficiency decreases, while it remains constant when derived from the volume mean diameter; 2) in diffusional collection, as the droplet diameter diminishes, the washing factor becomes larger and, when the range of the particle size distribution widens and the number of droplets of small diameter increases, efficiency improves; 3) the volumetric coefficient for gas absorption shows a similar tendency as the washing factor for diffusional collection; 4) as the relative velocity between droplets and gas stream increases, the effective gas film becomes thinner and the diffusional collection efficiency increases.

09950

Okuma, R., and H. Shimazu

AIR-POLLUTION PREVENTION IN CEMENT WORKS. Test in Japanese Netsu Kanri (Heat Engineering) (Tokyo), 19(4):18-26, April 1967.

Air pollution devices for Japanese kilns and dryers are reviewed. Electric dust collecting devices for cement kilns are said to be over 98.5% efficient. Six different types of rotary kiln (used mainly in Japan) and different types of dryers are illustrated. The main dust collecting devices are electrostatic collector (for kiln and dryer): multiclone (for cooler, ventilator, or dryer); starclone (for rapid dryer); cyclone (for coal dryer); wet system (for dryer); Venturi scrubber (for dryer); and bag filter (for crusher, conveyor, or wrapper). Some larger factories in Japan are restricted by law as to SO3 and SO2 content in the exhaust gas (22% of SO2 and SO3 per 1 gram of soot). The analysis of exhaust gas from a cement factory is given; particle size distribution of cement dust and a chemical analysis of collected dust are also given. Exhaust gas from cement factories generally does not exceed the legal limit for SO2 and SO3. Studies have shown that cement dust is not harmful to animals or plants, but efforts to minimize dust fall are continuing.

09956

Shiba, Tadao

THE CURRENT STATUS OF HEAVY-OIL DESULFURIZATION TECHNOLOGY. Text in Japanese. Sekiyu Gakkai Shi

((Journal of the Japan Petroleum Institute)) (Tokyo), 10(7):416-420, July 1967. 12 refs.

Desulfurization of crude oil and heavy petroleum residues is reviewed. Numerous types of sulfur compounds contained in the residue of heavy petroleum distillation and their reactions are discussed in terms of the hydrogen consumption for desulfurization of the residue. Representative catalysts proposed for desulfurization by hydrogenation are tabulated. Vanadium will reduce the activation rate of catalysts. Selection of the most effective catalysts for a given oil or residue depends on the desulfurization process employed. Six commercial desulfurization processes are illustrated and explained.

10564

Muschelknautz, E. and K. Brunner

EXPERIMENTS WITH CYCLONES. ((Untersuchungen an Zyklonen.)) Text in German. Chem. Ingr. Tech. 39(9/10):531-538, 1967. 16 refs.

Measurements conducted on a series of commercial cyclones confirm, in principle, the method of calculation proposed by W. Barth. The new curves for the degree of fractional separations vary considerably according to the construction of the separator, whereas it was formerly customary to use a single curve. Measurements at high loads have made possible an extension of the theory, by means of which the performance of normal cyclones may now be calculated with good accuracy for all possible loadings. The operating parameters of the cyclones are explored mathematically and grap[illegible] d.

10568

Schiele, G.

ELECTRIC CLEANING OF WASTE GASES FROM CARBON ELECTRODE BAKING FURNACES. ((Elektrische Reinigung der Abgase aus Elektrodenbrennofen.)) Text in German. Aluminium 43(3):171-174, March 1967.

Waste gases from carbon electrode baking furnaces contain extremely fine tar vapors with a range of boiling temperatures. These vapors can be precipitated most effectively by means of electrofilters. The gases in many cases must be cooled before tar vapor removal, due to the differences in boiling temperatures; if this step were not taken, the amount of tar vapor reaching the atmosphere would still be too high despite the filter's efficiency. The industrial application of the electrostatic precipitation gas cleaning process is described and illustrated.

11740

Schaefer, Manfred

NEW REFINERY IN THE SAAR. ((Die Saarland-Raffinerie.)) Text in German. Erdoel Kohle (Hamburg), 21(6):331-334, June 1968.

Prevention of water and air pollution is one of the subjects discussed briefly in a detailed description of the new refinery erected in 1967 near Saarbrucken, German. The refinert is a top-distillation plant with a capacity of 2 million tons per year, producing straight-run gasoline, light and heavy fuel oils, diesel oil, and refinery gas. In order to protect the neighborhood, the smoke from the tubular still (which has a capacity of 30 million kcal./hr.) is voided through a 90-meter stack, the height being calculated on the basis of the use of fuel oil with a sulfur content of 2.5%; in actual practice, the fuel oil used contains less sulfur, and gas from the stabilizing column is also used as fuel for the furnace. Escape of hydrocarbons is prevented by connecting the safety valves of the still to the discharge or torch system of the furnace. The more volatile products are stored in tanks with floating roofs. The waste water is also treated to remove volatile compounds, which are burned in the furnace, and is then led to a closed API separating tank.

11854

Goldschmidt, Klaus

EXPERIMENTS IN THE USE OF WHITE LIME HYDRATE AND DOLOMITE LIME TO DESULFURIZE FLUE GASES FROM OIL-AND PULVERIZED COAL-FIRED FURNACES. (Versuche zur Entschwefelung von Rauchgasen mit Weisskalkhydrat und Dolomitkalkhydrat bei Oel-und Kohlenstaub-Feuerung). Fortschrittber. VDI(Ver. Deut. Ingr.) Z., Ser. 6(21), 133p., Aug. 1968. 47 refs. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 138p.

The suitability of white lime hydrate and dolomite lime hydrate to desulfurize flue gases was tested by mixing the additives with pulverized coal by injecting them into the combustion chamber above the burner of a furnace heated with pulverized coal and oil. The experiments confirmed theoretical predictions that, due to the short residence time of flue gases and additives in a furnace, complete desulfurization is not feasible. Direct mixing of coal and additive caused formation of eutectic melts during combustion, leading to heavy caking of the furnace. Only small amounts of sulfur dioxide were bound by additive surfaces. A higher desulfurization rate was achieved by injecting the additive into the zone of the furnace where temperatures of about 1000 C prevailed. White lime hydrate was more satisfactory than dolomite lime hydrate, since the additive contains fewer impurities and the decomposition pressures of calcium sulfate are lower at constant temperature than those of magnesium sulfate. The best desulfurization results were obtained with oil-firing. Here, the additive depositions on the rear heating surfaces continue to bind S02 and are the major factors in the totally achieved desulfurization rate. Despite this, only 50% of the S02 was bound.

11910

CLEAN AIR. (Chistii vozduh.) Text in Russian. NTO-SSSR., 10(12):17-18, 1968.

In 1967 power plants in the Soviet Union emitted about 7 million tons of SO2. SO2 removal from combustion gases is carried out in four ways: 1) Dispersion by means of high chimneys; this approach is being studied in the Central Thermotechnological Institute, Main Geophysical Observatory, and in the Erisman Institute of Communal Hygiene. A formula for calculating the waste in relation to location, topography, and climatic conditions has been established; this approach was recognized as promising only for power plants with capacities up to 2400 megawatts. 2) Preliminary sulfur removal from fuels has been little studied. 3) Gasification process of Christianovich in VNIINP and Giprogazoochistka has been patented. 4) Processes for SO2 removal in solid fuel combustion were presented by V. Lazarev and N. Pitelina. The most promising, according to economic indexes, are the cyclic magnesite and ammonia-autoclave methods, which give 95-95%, and 92% removal rates, respectively. The advantages of the former are that it uses the cheap magnesite and does not require cooling and dust- removal; the advantages of the latter are the formation of high- purity sulfur and the fertilizer, ammonium sulfate. The disadvantages of the cyclic magnesite method are difficulties in working with the suspension, high fuel consumption, and burning of magnesium sulfite crystals. The disadvantages of the ammonia- autoclave method are the high ammonia consumption and the necessity for preliminary dust-removal. The SO2 formed in the petroleum refining is revoved by the Klaus method or the method of wet catalyzer to sulfuric acid. There are more than 20 methods for industrial H_2S removal from gases. Most methods have the aim of technological exploitation of the removal H_2S and are not suitable for sanitary purification. For the latter purpose the best are the oxidation methods which use adsorption of H_2S to alkaline solutions (soda or ammonia) and oxidation to elemental S by a catalyzer. The oldest, iron-soda method, has many disadvantages (long duration, detrimental effect on the equipment, poor gas purification) and is to be replaced in U.S.S.R. plants manufacturing synthetic fibers, by an alkali-hydroquinone method. Its advantages are: absence of suspension, simpler procedure of exploitation, and yield of high-purity sulfur. The method of dry oxidation with activated coal by which H_2S is oxidized to elemental S has the advantage that the coal functioning as catalyzer and adsorber can remove H_2S, CS_2, and other impurities. Hydrocarbons and their products, which are important air pollutants from the petroleum industry, can be

11931

Krasovitskii, Yu. V. and V. A. Zhuzhikov

SEPARATION OF DUST FROM STREAM BY FILTRATION AT CONSTANT VELOCITY. (Nekotorye zakonomernosti protsessa razdeleniya pylegazovogo potoka fil'trovaniem pri postoyannoi skorosti). Khim. Prom. (Moscow), no. 2:49-52, 1963. 5 refs. Translated from Russian by Elmar K. Wilip, Argonne National Lab., Ill., 8p., Feb. 1968.

Since conventional methods of purifying gases from finely dispersed dust cannot be applied at temperatures above 600 C, the use of laminar filters has been suggested. These filters consist of granules of fire-resistant materials. As indicated by preliminary experiments, separation of dust from a gas stream by such a filter corresponds to filtration with a gradual plugging of the pores of the filtration partition during the purification of liquids where the concentration of solid particles is low. The process was studied only for cases where the pressure difference on both sides of the partition remained constant during filtration. Separation of dust from a gas stream by a laminar filter is carried out at constant flow velocity. In the present study, an equation was derived to describe filtration with a gradual plugging of the pores of the filtering partition at a constant flow velocity. Separation of particles below 1.5 micron from smelter dust corresponds to such filtration. An expression was also obtained for expressing the correlation between filter efficiency and its hydraulic resistance.

11952

Soejima, Umio and Koichi Yoshida

COUNTERMEASURES TO AUTOMOBILE EXHAUST GAS. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 1(1):13-17, 1966. Translated from Japanese. 24p.

Measures to stem automobile exhaust gas emissions enacted in Japan, the U. S., and in Europe are discussed. Japan had about 8 million automobiles at the end of May 1966. Since 1965, the Ministry of Transportation has enforced measures to stem emissions by automobiles. All new models of cars must undergo a standarized test to determine whether the maximum allowable emission concentrations are exceeded. The following driving conditions are simulated on a dynamometer: idling; cruising at speeds from 10 km/hr to 70 km/hr in intervals of 10 km/hr; acceleration from 0 speed wherein the rate of acceleration is 0.1 g and the final speed is reached in five steps beginning at 30 km/hr; and deceleration by engine braking, wherein the rate is 0.06 g. The measures taken to stem exhaust gas emissions consist of engine modifications such as improvement of the air-fuel ratio, the air intake, the ignition time, the combustion chamber, and the valve timing; remodelling the muffler into a direct flame afterburner or a catalytic converter; and addition of chemicals to the fuel. A method is under consideration by which oxygen is mixed with the gasoline so that incombustible matter is oxidized in the combustion chamber. Presently studies are under way primarily in the U. S. to inject air into the exhausts. Studies in Europe concentrate on the elimination of carbon monoxide emissions and on diesel smoke. Japan also focuses its attention on elimination or at least reduction of the carbon monoxide fraction in automobile exhaust.

12966

Matsumoto, Keishin and Yasuhiro Takemura

INTRODUCTION TO THE TECHNICS OF HYDRODESULFURIZATION OF HEAVY OIL. (Juyu no datsuryu gizutsu). Text in Japanese. Nenryo Kyokai shi (J. Fuel Soc. Japan), 48(3):160-170, 1969. 24 refs.

Processes employed in the hydrodesulfurization of heavy oil are discussed. Both direct and indirect methods, and a combination of the two are reviewed. The indirect method is recommended as the best. Kinetics and equilibria of the processes are discussed. Equilibrium constants for 40 S complexes are tabulated and an equation for whole reaction rate is given. The diffusion process is shown to be effective through kinetic and equilibrium considerations. The relationship between catalyst structure and activity is described. Cobalt-Mo, Ni-Mo, and Ni-Mo-Co systems with Al_2O_3 as a 'builder' are explained. Various hydrodesulfurization processes used by industry and the characteristics of the raw materials used are tabulated.

13026

Minoura, J.

ON THE NOVEL METHOD OF COPPER REFINING WITH THE AIM OF PREVENTION OF POLLUTION BY MINERALS. (Kogai-boshi o mokuteki toshita atarashii doseiren-ho ni tsuite). Text in Japanese. Netsu Kanri (Heat Engineering, Tokyo), 21(5):12-16, May 1969.

A novel copper refining method, using 'The Auto-blast furnace' developed in Finland, is becoming predominant in Japan. It has three notable advantages: (1) easy re-absorption of SO_2 by means of compressed flue gas; (2) low cost, because of less investment for the facilities and equipment for pollution prevention; and (3) production of more by-product H_2SO_4. The refining process can be briefly summarized as follows: (1) preliminary process, in which the minerals are dried; (2) melting and refining; and (3) handling of flue gas. A significant aspect of this method is that controlling the temperature and pressure within the furnace and cyclone enables almost perfect re- absorption of SO_2 emitted and production of a considerable amount of H_2SO_4.

13094

Koutnik, Josef and Pavel Novotny

FLUID-BED COMBUSTION OF COAL FOR DE-SULPHURIZING THE COMBUSTION PRODUCTS. (Fluidni spalovani ob z hlediska odsireni spalin). Text in Czech. Energetik (Prague), 19(6):222-228, 1969. 10 refs.

Trapping sulfur dioxide during solid fuel combustion in fu nace hearths of heat plants poses one of the most topical e gineering and economic problems in Czechoslovak power e gineering. At the present time, considerable attention is bein devoted abroad to a new combustion technique, fluid-be combustion, mainly because it makes possible the trapping of sulfur dioxide by employment of the additive process. Information on the first international conference on fluid-bed combustion, which was largely concerned with desulfurization, is presented. The conference was held on Nov. 18 to 22, 1968 and was organized by NAPCA. The results reported at the conference promise an effective and simple method for limiting sulfur emission. (Author abstract modified)

13127

Svajgl, Oldrich

HYDROGENATION CRACKING OF DIESEL OIL FROM ROMASHKINO PETROLEUM. (Hydrogenacni stepeni motorove nafty z romaskinske ropy). Text in Czech. Chem. Prumysl, 19(3):103-106, 1969. 11 refs.

Experiments are described on the hydrogenation cracking of sulfur-containing Diesel oil having 50 ppm of chemically bound nitrogen. The hydrogenation cracking succeeded at a pressure of 300 atm with a common wolfram catalyst preceded by a hydrogenation refining catalyst. The resulting gasoline and Diesel oil have low sulfur contents and are of better quality than the primary products. The harmful effect of ammonia, which originates from the nitrogen-containing substances, can be eliminated by elevating the temperature. It has been verified that sulfur in Diesel oil activates the cracking catalyst. (Author summary modified)

13206

Bulicka, Milan, Jaroslav Podmolik, and Josef Hajek

ECONOMY OF ABSORPTION UNIT INSERTED FOR LOWERING OF EXHALATIONS FROM SULPHURIC ACID PRODUCTION PLANT. (Ekonomie vyroby kyseliny sirove s vlozenou absorpci). Text in Czech. Chem. Prumysl (Prague), 19(3):140-142, 1969. 5 refs.

When the daily production of sulfuric acid ranged to 100 t/day, with 95 to 97% conversion and with an average absorption of 99%, even with relatively low chimney heights, the immediate vicinity of factory was free from emissions. When production exceeded 300 t/day, higher chimneys did not sufficiently reduce the local concentrations. In most plants using the heterogeneous oxidation manufacturing method, SO2 emissions are 0.2 to 0.4%, SO3 emissions are 0.02 to 0.1%, and H2SO4 emissions are 0.075%. For the work in Prerov, which produces 100,000 t/year, a two- stage exothermic process of catalytic oxidation of SO2 was adopted. Output is higher than 103,000 t/year, and 10 kg of sulfur are recovered for 1 t of the manufactured sulfuric acid. The process uses a closed circuit of cooling water which requires 20% more water than with traditional methods, and 3.5 kWh/t more sulfuric acid, and which produces 10 kg less of steam per ton of sulfuric acid. The cost of the absorption equipment is offset by the value of the sulfur recovered. The greatest advantage of the unit is its reduction of harmful emissions.

13334

Ruus, Av Lennart

INVESTIGATION OF ODOR ELIMINATION BY AB MORRUMS BRUK, MORRUM. (Undersokning av lukteliminerinsanlaggning vid AB Morrums Bruk, Morrum). Text in Swedish. Svensk Papperstid. (Stockholm), 66(15):554-557, Aug. 15, 1963. 1 ref.

An oxidation tower system for reducing odorous compounds formed during alkaline pulping was developed by the British Columbia Research Council and installed at AB Morrums Bruk, Morrum, Sweden, where its efficiency was investigated. The system involves the pumping of black liquor through the oxidation tower in the same direction as a gas mixture containing air, uncondensed gases from the turpentine recovery, and gases from the digester blow. After leaving the oxidation tower, the mixture is washed with chlorine and dilute sodium hydroxide in a scrubber before being vented into the atmosphere. Gas chromatographic determination of the amount of methyl mercaptan, dimethyl monosulfide, and dimethyl disulfide in the gas mixture before and after it had passed through the tower and scrubber reveals that the system removes more than 99% of the methylsulfides and more than 97% of the mercaptans. The greater part of these compounds is taken up by the black liquor in the oxidation tower; the rest is oxidized in the scrubber. The concentration of the odorous compounds in the outlet from the scrubber is very low and their smell can be characterized as 'faint'. About 90% of the sodium sulfide in the black liquor is oxidized in the oxidation tower. (Author abstract modified)

13630

Lowicki, Norbert

THE NEW WASTE GAS DESULFURIZATION METHOD OF THE GRILLO WERKE AG. (Das neue Abgas-Entschwefelungverfahren der Grillo-Werke AG.) Text in German. Erzbergbau Metallhuettenwesen, 21(12):567-571, Dec. 1968.

There are three methods for desulfurizing waste gases; first by oxidation of SO2 to SO3 on vanadium catalysts, secondly by adsorption of gaseous sulfur compounds on activated coal or coke, and thirdly by absorption, i.e., chemical binding of acid components in the waste gas by alkaline substances. Detailed discussion of the latter method shows that in all cases where this principle has been put into practical use, costs ran tremendously high, primarily because of the complicated regeneration and recovery operations for the absorbent and the sulfur bound by it. The Grillo Werke AG, in developing its absorption method, tried to make it as economical as possible, and although the present method is not the definitive solution, it does provide some advantages over other methods. The Grillo method is based on the principle of formation of oxide compounds between an alkaline and an amphoteric heavy metal component. Thus, the two components mutually prevent each other from being inactivated by the temperatures necessary for thermal regeneration. In this way, both sulfur dioxide and hydrogen sulfide can be bound. Manganese and magnesium are used as elements for the formation of oxide compounds. Experiments in a large-scale plant showed that between 80 and 95% of the SO2 of a waste gas could be removed. Interestingly, the degree of loading of the absorbent suspension played a secondary role. The absorbent which is tapped off in dry state contained between 17 and 21% sulfur, which justifies recovery operations. Any sulfuric acid factory in the vicinity can be used for this purpose. A detailed description of the experiments is given, as well as an example of practical application of the Grillo absorption method.

13697

Obering, E. Albrecht

SLUDGE INCINERATION IN THE FLUIDIZED BED FURNACE. (Schlammverbrennung im Wirbelschichtofen). Text in German. Chem. Ing. Tech., 41(10):615-619, 1969. 2 refs.

Sewage sludge disposal becomes an ever greater problem sinc dump sites are becoming scarce and awareness of the dange of uncontrolled dumping is spreading. Disposal by incineratio decreases the volume and leaves sterile ash and inert odorle gases. Sludge incineration must be preceded by mechanic dehydration to avoid emission of volatile organic sludge components with the waste gas and to permit autonomous combustion. To achieve the latter goal, the combustion temperature must be high, the excess air in the reaction chamber low, the incineration complete, and the temperatures of the waste gases and vapors low. However, the waste gas temperature may not drop below 750 C if odors are to be avoided and if the residues ought to be sterile. To solve the problem, the fluidized bed furnace must be used. The sludge falls into a bed of turbulent sand particles where it is dried, degassed, and ignited. The temperature of the waste gas at the combustion chamber outlet is 800 to 900 C. It is cooled in an air preheater and the heat is returned to the combustion chamber. In the subsequent dust collector, the mineral sludge components are separated as dust either by a wet or dry process and tapped off to an ash pit. The turbulent sand particles are slowly eroded and carried off with the ash. They are replaced by larger ash particles and by sand brought in by the sewage sludge. The furnace has no movable parts aside from the charging facility and the ventilators so that wear and tear are low. The city of Lausanne has operated such a fluidized bed furnace since 1965. The furnace burns 2600 kg of dehydrated sludge per hour (max. water content 60%). Part of the waste gas is used to heat the combustion air and the rest goes to a boiler. The waste gases are cleaned in cyclone separators and electrostatic precipitators.

13731

Matsuno, Kazutaka and Koichi Iinoya

ESTIMATION OF COLLECTION EFFICIENCY OF A DIELECTRIC FIBROUS FILTER. (Yuden seniso fuiruta no hoshu koritsu no suitei). Text in Japanese. Kagaku Kogaku (Chem. Eng.), 33(7):684-689, July 1969. 10 refs.

Inertia, scattering, and interference are three mechanisms affecting the collection of particles in a fibrous filter. Inertia is the dominant factor when both linear speed and diameter of particles are large; scattering is dominant when both linear speed and diameter of particles are small; and interference, which minimizes collection efficiency, is dominant when it occurs between inertia and scattering. By the use of a dielectric fibrous filter, collection efficiency is remarkably improved and interference is reduced. The dielectric fibrous filter retains both bipolar cylinders and bipolar particles within the same electric field; polluted air passes vertically through this filter. The volume fraction of fibers is less than 0.02, and there is a constant relation between the coefficient of interference and the volume fraction. Both collection efficiency of a single fiber in a dielectric fibrous filter and total collection efficiency can be calculated, and thus the collection efficiency can be controlled by changing factors in the equation. High collection efficiency is achieved with only a small loss of air pressure inside the filter.

13732

Nakagawa, Shikazo

ECONOMICAL STATUS FOR RECOVERING SO2 FROM STACK GASES. (Haien datsuryu no keizaisei). Text in Japanese. Kagaku Kogaku (Chem. Eng.), 20(8):57-64, Aug. 1969. 13 refs.

Both direct and indirect desulfurization of crude petroleum require expensive equipment, and neither method removes more than 15% of the total sulfur from the petroleum. Desulfurization of stack gases is more economical, and studies on it have multiplied in recent years. Desulfurization techniques investigated by the Tennessee Valley Authority since 1952 include activated carbon adsorption, catalytic oxidation, the manganese dioxide process, alkaline absorption with ammonia, alkalized aluminum, and limestone. The results of TVA's studies of desulfurization with limestone show that 50 to 60% removal of sulfur dioxide from crude petroleum is obtained by injecting stack gases with dried limestone and that adsorptive potency is related to the roughness of the limestone. This dry process does not need expensive equipment and has other practical advantages. The wet process using limewater removes more than 85% of sulfur dioxide, but has two disadvantages namely, the drop of exhaust gas temperature at the chimney exit and lime deposits on the interior surfaces of equipment. The latter problem can be solved by placing a turbulent floor inside the equipment. To meet the shortage of sulfur and sulfuric compounds, several techniques utilizing SO2 as a source of sulfur have been devised which use ammonium or potassium phosphate to good advantage.

13734

Nishino, Kazuyoshi and Katsumi Yamamoto

CONSTRUCTIONAL ALLOY IN A DESULFURIZATION PLANT. (Datsuryu sochi no kinzoku zairyo). Text in Japanese. Sekiyu Gakkai Shi (J. Japan Petroleum Institute, Tokyo), 12(6):450-456, June 1969.

About 90% of the petroleum used in Japan has a high average sulfuric compound concentration of 2.7%. Desulfurization removes sulfur, H2S, and SO2. This paper concerns hydrogenized desulfurization which requires excellent materials and techniques appropriate to high temperature, high pressure, and high concentration of sulfuric compounds. The direct desulfurization of the crude petroleum at normal pressure has a high desulfurization ratio, although the temperature, pressure, and concentration of hydrogen and H2S are significantly high. Thick stainless steel is not only expensive but also very sensitive to corrosion by sulfuration. The severity of corrosion of alloy steel and stainless steel caused by H2S with hydrogen in the dry procedure is significantly increased with the increase of H2S concentration and temperature, and is markedly decreased with the increasing amount of Cr within the alloy. In the wet procedure, however, the corrosion caused by H2S and hydrogen is much more severe than in the dry procedure. In order to avoid corrosive cracking, the use of adequate alloys, including double-layered steel, and/or procedures to remove sulfuric compounds during the time of cooling the equipment are being explored with increasing success. The vessel walls supported by multiple cold layers and internal fire-proof lining resist high temperature, high pressure, and high concentration of H2S. The conducting tubes which connect one vessel to another also need high tolerance against the pressure and corrosive effect of H2S, especially at the connecting portion. A fireproof cast iron alloy, HF, and an improved type HF, which includes [illegible] to 15% of delta-ferrite, are cheap and corrosion- resistant. Aluminum-containing steel is excellent as an alloy coverage because it is very stable in the presence of high temperature, high pressure, and high concentration of sulfuric compounds.

13817

Pechkovskiy, V. V., A. N. Ketov, T. G. Mal'tseva, and V. G. Pridatchenkov

THERMOGRAPHIC STUDY OF THE REACTION OF SULFUR DIOXIDE WITH CALCIUM CARBONATE IN AN OXIDIZING ATMOSPHERE. (Termograficheskoy issledovaniye vzaimodeystviya sernistogo angidrida s karbonatom kal 'tsiya v okislitel 'noy atmosere). Text in Russian. Izv. Vysshikh Uchebn Zavedenii, Khim. i Khim. Teckhnol., 6(4):991-996, 1963. 11 refs.

The possible usefulness of calcium carbonate as an absorber of SO2 and SO3 is supported by data from a thermographic analysis of the system CaCO3(CaO) - SO2(SO3) - air. Sulfur dioxide in an oxidizing atmosphere reacts energetically with calcium oxide produced by decomposition of calcium carbonate and limestone, calcium sulfate being formed through a sulfitation step. Calcium sulfite is the basic product at 300-500 C, calcium sulfate at higher temperatures (up to 1000 C). Calcium sulfate may also be formed through oxidation of SO2 to SO3 and reaction of the latter with oxygen and calcium carbonate. These chemical mechanisms are of importance in the lime method of removing SO2 from power station flue gases. Data both from the literature and from new experimental work were used in the study.

13898

Chertkov, B. A.

OXIDATION OF CALCIUM SULFITE IN THE EXTRACTION OF SO2 FROM GASES. (Okisleniye sul 'fita kal 'tsiya v protsesse izvlecheniya SO2 iz gazov). Text in Russian. Zh. Prikl. Khim., vol. 33:1708-1714, 1960. 7 refs.

The rate of oxidation of calcium sulfite formed in the extraction of SO2 from exhaust gases was found to average 9.4 g/sq m-hr with an average oxygen absorption coefficient of 72 g/sq m-hr-atm for the test absorber. The degree of oxidation was found to result from the simultaneous effect of a number of factors influencing mass transfer in the liquid phase (e.g., reflux density, temperature, and composition of reflux solution). It was found that addition of 0.002-0.004% P-aminophenol to the circulating solution has a long-term retarding effect on calcium sulfite oxidation and results in a three to five-fold decrease in sulfate formation.

13924

Francois, R. C., M. Plantier, M. Bailleul, and G. Guyot

AIR POLLUTION IN THE LACQ COMPLEX. (La pollution atmospherique dans le complexe de Lacq). Text in French. Pollut. Atmos. (Paris), 11(42):71-73, April-June 1969.

A history of the progressive industrialization of the Lacq region is presented. Most of the pollution in this region is caused by the SO2 given off by the Societe Nationale des Petroles d'Aquitaine (S. N. P. A.). It was found that natural gas treatment does not totally eliminate SO2. The S. N. P. A. and the Lurgi-Waerme Company from Frankfurt have developed a new process called 'Sulfreen' which reduces the amount of sulfur compounds emitted into the atmosphere. The first unit will treat 130,000 cu nm/hr of gas. The principle of the process is as follows: One of the two reactors is in contact with the gases coming from the two primary converters of the sulfur plant at 125-130 C. Its catalyst becomes increasingly burdened with sulfur while the second reactor is being regenerated by a closed-circuit flow of gas which has been heated in a furnace. The deposited sulfur is vaporized by the hot gas and condensed in the condenser where the gas is cooled. A ventilator completes the circuit.

14226

Kamino, Yasumi, Shigenori Onizuka, Kenji Yasuda, Masaaki Miyaji, and Yoshihide Kawamura

REMOVAL OF SO2 GAS IN EXHAUST GAS BY STEAM-GENERATED ACTIVATED CHARCOAL PROCESS (III) DESORPTION OF SO2 GAS BY STEAM. Translated from Japanese. Hitachi Shipbuilding Co. (Japan), p. 1422, (1968).

Since the absorption capacity of activated charcoal drops gradually as it absorbs a greater volume of sulfur dioxide gas, the charcoal must be regenerated by desorbing the SO2 from it. For this purpose the Reinluft process uses high temperature inert gases and, in large projects, rinsing. This paper describes an attempt to obtain the same results by using superheated steam at about 300 degrees C. The interrelation is shown between the condition of absorption and the weight or composition of the absorbed gas.

14289

Hohmann, Hans and Horst Huckauf

INVESTIGATIONS OF THE SYSTEM CACO3-SO2-H2O(D) IN CONNECTION WITH PROBLEMS OF DUST AND SO2 EMISSION FROM CEMENT KILNS. (Untersuchungen zum System CaCO3-SO2-H2O(d) in Verbindung mit Problemen der Staub- und SO2-Emission von Zementbrennaefen). Text in German. Silikat Tech., 20(5):148-155, 1969. 23 refs.

The four alkali earth carbonates (CaCO3, travertine, limestone, and dolomite) were studied with respect to their adsorption of sulfur dioxide and water vapor using gas chromatography. It was found that CaCO3 dried at 180 C at first adsorbs considerable quantities of SO2 from a SO2- and CO2-containing gas. The SO2 adsorption isotherms found by the frontal gas chromatographic process of G. Schay all belonged to type I of Brunauer's classification. Water vapor adsorption of all four carbonates was determined at 20, 40, 60, and 80 C. The water vapor adsorption isotherms were found to belong to type II of Brunauer's classification. Studies by the gas chromatographic pulsed flow method showed that SO2 adsorption by the system CaCO3-SO2-H2O at temperatures ranging from 0 to 100 C occurs at relative water vapor partial pressures of almost 1.0. Chemical conversion of SO2 to calcium sulfite occurs at partial pressures down to zero. This leads to the conclusion that formation of the adsorbed water vapor into a three dimensional fluid at the absorbent surface is a more thorough process than all known theories concerning water vapor adsorption on solids have anticipated. A critical relative water vapor partial pressure for calcium sulfate formation was found at 0.50, above which higher chemical activity occurs. Calcium sulfite (at oxidation) or calcium sulfate solidifies calcium carbonate dust and changes its surface properties. Cloth filters and electrostatic precipitators are thus hampered in their function. Five known types of waste gas of desulfurization are discussed.

14703

Storch, O.

THE EXISTING EXPERIENCES WITH DRY AND WET SEPARATORS IN METALLURGICAL WORKS. (Dosavadni zkusenosti se suchymi a mokrymi aeromechanickymi odlucovaci v hutich). Text in Czech. Ochrana Ovzdusi, no. 4:60-63, 1969. 4 refs.

Aeromechanical and wet separators are considered in terms of their dust collecting efficiencies for metallurgical and technological processes involving the use of oxygen. Previous dry aeromechanical separators had relatively low efficiency and did not meet hygienic requirements. Wet separators reached acceptable levels of separation, but their tendency to become clogged with sediment limited their usefulness. A new aeromechanical separator processes dust in agglomerations at an efficiency level of 95%; the diameter of this apparatus is 630 mm. A new venturi-type separator of rectangular cross sections separates micron and submicron particles from the brown smoke produced in metallurgical processes. Extremely good results were obtained when this scrubber was used to treat combustion products from open and double hearth furnaces in pilot plant operations.

14940

Tada, Mitsuru

INDUSTRIAL WASTE INCINERATION BY FLUIDIZING SYSTEM. (Sangyo haikibutsu no ryudoshokyakuho). Text in Japanese. Kogai to Taisaku (J. Pollution Control), 5(7):529-533, July 1969.

Fluidizing systems, which are widely applied to petroleum and mineral combustion, are highly efficient. The outstanding merits of this system are a capacity of 500 kg/cu m-hr incineration: the ability to incinerate low-calorie wastes (1000/k-cal/kg, water 70%) without catalysts; perfect combustion with kiln heat around 750 C; no stack smoke or odor problems; simplicity of structure, with no vibrations inside the kiln and constant and stable internal heat; availability of electric power, produced though the process in large-scale (400 t/day) kilns of this system; convenient operation requiring no heavy or intensive labor; and economical maintenance. The system has a wide range of applications, including waste incineration in the chemical, food processing, and petroleum industries, and excrement and sludge treatment. For example, the liquid wastes from paper manufacturing plants that used to be discharged into rivers, bays, or seas and caused problems for agriculture, fishing, and shipping may now be incinerated, removing all the organic matter contained in pulp wastes, and chemical compounds such as Na2SO4 or Na2CO3 may be recovered and reused in kraft pulp production. Adaptation of this system to watery wastes in the food and chemical industries has the advantages of deodorizing wastes and recovering ash for use as fertilizer. The system can be adapted to petroleum and petrochemical wastes and to high-temperature wastes.

15300

Toos, Istvanne

NEUTRALIZATION OF HYDROGEN SULFIDE RELEASED FROM OIL REFINERY PROCESSES. (Asvanyolajiparban keletkezo kenhidrogengaz semlegesitese). Text in Hungarian. Munkavedelem, 14(4-6):1-4, 1968. 18 refs.

According to Hungarian industrial health standards, the maximum permissible hydrogen sulfide concentration in workshops is 10 mg/cu m. Catalytic reforming and fuel oil desulfurization processes in the Petrochemical Works of Komarom produced (after ethaholamine extraction) a flow of 220-650 kg/hr; 98% of the gas was pure H2S, and only 2% was H2O or light hydrocarbons. To remove H2S, economic studies suggested the use of absorption methods giving Na2S as the end product. The process first involves obtaining 72% concentrated NaOH-H2O solution from a 45% starting solution in a vacuum still, at 80-90 C. Then the gas mixture containing H2S will be reacted with the NaOH solution; the Na2S crystals produced are distilled in one or two steps depending on their water content. The remaining gas is transferred from the reactor vessel to cadmium acetate washers where the unreacted H2S is absorbed. The NaOH concentration will control the reagent content of the developing Na2S; the NaOH concentration may be controlled by temperature and pressure regulation. No further cleaning of the Na2S is necessary.

15759

Frauenfelder, A.

WHAT HAS BEEN DONE BY THE SWISS CEMENT INDUSTRY TO ELIMINATE THE DUST PROBLEM IN THEIR DIFFERENT WORKS. (Was hat die schweizerisc Zementindustrie fuer die Entstaubung ihrer Werke getan). Text in German. Zement-Kalk-Gips (Wiesbaden), 58(11):501-504, Nov. 1969. 3 refs.

There are only 18 cement works in Switzerland with relatively small capacities and only one kiln producing more than 1000 tons per day. Since 1950, this industry made great strides in air pollution control. The Swiss Association of Cement, Lime, and Gypsum Producers established their own rules for dust emissions in 1963 which were binding for members. Clean gases from new installations should not have more than 75-100 mg dust/cu m. Older plants have until 1973 to reduce their emissions to 100-150 mg dust/cu m. A federal law states that only plants which meet these requirements obtain approval from the Authorities of the Canton. In all cement works meeting the emission standards, adequate dust collection devices are in operation. The sources of dust in the cement works, adequate dust collection equipment, and costs were discussed. Equipment includes bag filters for dry dust and gases at low temperatures, electrical precipitators for the cleaning of waste gases from kilns, and raw material dryers. Installation difficulties from corrosion and methods for the correction of the problem were described. Multicyclones and gravel bed filters also have special applications in the dedusting of clinker coolers. It was concluded that many Swiss cement works are clean and by 1973, all cement works will meet emission standards. (Author summary modified)

15839

Yanagisawa, S. and H. Isomura

MANUFACTURE OF SULFUR DIOXIDE GAS. (Aryusan gasu no seizo-ho). Text in Japanese. (Hodogaya Chem. Ind. Co., Tokyo) Japanese Pat. Sho 34-2960. 2p., April 24, 1959. (Appl. Feb 15, 1957 claims not given).

The waste acidic substances derived from the purification system of crude petroleum refineries includes a great many sulfur compounds and can be utilized to manufacture sulfur dioxide gas by the following two procedures. First, the waste substance is added to a calcium sulfite (CaSO3) solution causing formation of SO2 gas as well as H2S, mercaptans, and organic sulfur compounds. The CaSO3 used in this procedure is obtained at low cost by the absorption of SO2 waste gas from other refineries by alkaline calcium compounds also derived from other industries. The plaster produced by the first procedure is utilized for the manufacture of cement or nickel mat. Secondly, a mixed gas including several kinds of volatile sulfur compounds is heated within the hearth at 600 C to form SO2 gas. This is a convenient and economical means of producing SO2 from the waste substances of the petroleum refinery.

15952

Error, James Victor, George Wesson Ostberg, and John Lilis Disney

A METHOD FOR DESULFURIZATION OF CRUDE OILS WITH A WIDE RANGE OF BOILING POINT BY HYDROGENATION. (Koffutteuhani genyu o suiten datsuryu suru hoho). Text in Japanese. (Esso Standard Eastern, Inc., New York) Japanese Pat. Sho44-13374. 7p, June 16, 1969. 1 ref. (Appl. May 4, 1962).

The invention relates to the desulfurization of the broad cut portion of crude oil by hydrogenation. The broad cut portion contains naphtha, kerosine, etc. as single cuts. The crude oil is heated until all the broad cut part evaporates and is distilled by flash evaporation under the pressure of 30 psi. The vapor is condensed and cooled to a temperature lower than 200 F. After removal of the uncondensed gas, the liquid is heated at 100 to 1000 psi and then at pressures high enough for all contents to evaporate. Hydrogen gas is added, and the broad cut portion desulfurized in the presence of a catalyst such as cobalt molybdate at 500 to 800 F and at 400 to 500 psi. The hydrogen sulfide generated is washed away by an amine solution such as dimethylamine or diethylamine. A narrow boiling point oil is obtained by the fractional distillation at about 60 psi. Application of this method to crude oil containing 1.9% sulfur decreased the sulfur content of kerosine to 0.0004%, and that of light straight naphtha to 0.0002%.

15957

Mel'nik, M. N.

MEASURES FOR SANITATION OF ATMOSPHERIC AIR IN THE UKRAINE. (Meropriyatiya po ozdorovleniyu atmosfernogo vozdukha na Ukraine). Text in Russian. In: Sanitation Measures Against Air and Water Pollution in the Planning of Cities. (Ozdorovleniye vozdushnogo i vodnogo basseynov gorodov). Government Committee on Civil Building and Architecture (ed.), Lecture series no. 2, Kiev, Budivel'nik, 1968, p. 17-18.

Control measures instituted at cement plants in Dneprodzerzhinsk and Krivorozhsk have given significant reduction in quantities of dust emitted into the atmosphere. The ore enrichment combine at Krivorozhsk was provided with dust control equipment which resulted in a substantial recovery of iron. Effective gas purification measures at the Kramatorsk Metallurgy Plant and at the Zaporozhstal Martensite Furnace No. 2 are also reported. Failures at pollution control have occurred at some locations, especially in the Donbass, because the actual efficiency of control equipment has been significantly below the design values, or else already existing pollution sources were not adequately accounted for.

16325

Gottwald, Miroslav and Karel Obroucka

MODEL RESEARCH OF FLAME AND WASTE GAS AERODYNAMICS IN OPEN-HEARTH FURNACES. (Modelovy vyzkum aerodynamiky plamene a spalin martinske pece). Text in Czech. Hutnicke Listy (Prague), 24(12):843-849, Dec. 1969. 8 refs.

An isothermal model was applied to the study of the flame and waste gas aerodynamics in the open-hearth furnace. The flow was studied by measuring the selected sections with the help of a pneumatic probe provided with three holes. The tests revealed that the furnace was operated with the atomizing air volume adjusted wrongly, which resulted in the insufficient momentum of the oil burner. Corrections were suggested and were checked in the model tests. Theywere then put into operation. As a result, the heat time was cut and the furnace output was increased. (Author abstract modified)

16350

Maksimov, V. F., O. I. Sokolova, Z. P. Modzelevskaya, and N. M. Isayeva

PURIFICATION OF THE WASTE GASES OF SULFATE-CELLULOSE PRODUCTION ON FOAM TYPE UNITS. Bumazhn. Prom. (Moscow), 34(5):14-16, May 1959. 2 refs. Translated from Russian. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 8p.

Experiments were conducted on the decontamination of exhaust gases in sulfate-cellulose production by the foam method, based on the interaction of a gas and liquid in a layer of moveable foam formed as a result of their counterflow. It involves the purification of gases from the plant furnace, concentrator, and boiler units. When the gas flow rate of the foam device was varied from 0.4 to 3.2 m/sec, the purification of furnace gases was constant and amounted 92-95% (based on total sulfur). After purification, 10-40 mg/cu Nm hydrogen sulfide, 8-46 mg/cu Nm methyl mercaptans, and 3-120 mg/cu Nm sulfur dioxide were present in furnace flue gases. Decontamination of the boiler gases removed 92% of the hydrogen sulfide, 90.7% of the methyl mercaptans, and 86.0% of the sulfur dioxide. When the simultaneous decontamination of exhaust gases from furnace, concentrator, and boiler sections was studied, using caustic soda as a wetting liquid, 92.3% of the hydrogen sulfide, 84.7% of the methyl mercaptans, 86.6% of the dimethyl disulfide, 72.8% of the dimethyl sulfide, and 89.9% of the sulfur dioxide were trapped. When black lye was used as the wetting agent in an oxidation tower, no odor of sulfur-laden gases was detectable.

16419

Pozin, M. Ye., Y. P. Mukhlenov, and L. S. Vasilesku

OXIDATION OF SULFUR DIOXIDE IN IRON SULFATE SOLUTION. (Ob Okislenii sernistogo angidrida v rastvore sul'fatov zheleza). Text in Russian. Zh. Prikl. Khim., 28(7):681-686, 1955. 7 refs.

The oxidation of SO_2 in the presence of iron ion was studied experimentally. The following optimum conditions were established for simultaneous processing of waste gases and pickling solutions: 1) during oxidation of $FeSO_4$ to $Fe_2(SO_4)_3$ - temperature from 60-80 C, incoming SO_2:O_2 ratio of 1:5, an initial concentration of ferrous sulfate up to 18% does not affect the course of the reaction; 2) during sulfuric acid formation - temperature from 80-90 C, SO_2:O_2 ratio equal to 1:4, optimum iron ion concentration, 10-30 g/liter. An acid formation rate of about 1000 kg of sulfuric acid monohydrate from a cubic meter of reaction volume was achieved in the laboratory under optimum conditions. These experiments demonstrate the advisability of examining the reaction of SO_2 exhaust gas with spent pickling solutions under plant conditions for the purpose of recovering the pickling solutions or for producing dilute sulfuric acid and crystalline ferric sulfate.

16510

Padovani, C.

SULFUR DIOXIDE EMISSIONS FROM LARGE HEATING PLANTS: PROBLEMS AND SOLUTIONS. PART II. (Emissione di ossido di zolfo delle grandi centrali termiche: problemi e soluzioni. Parte II). Text in Italian. Riv. Combust., 22(7/8):389-396, July-Aug. 1969. 65 refs. Part I Ibid, no. 5, 1968.

The following fuel oil desulfurizing plants are under construction or in the planning stage: H-oil unit of 24,000 barrels/day at Shinoiba, Kuwait; an Isomax plant, 35,000 b/d at Mina Abdullah, Kuwait; and an Isomax plant, 40,000 b/d in Chiba, Japan. The economic problem of providing low-sulfur fuel oil in Europe differs from that of the United States in that there is a greater demand for gasoline and medium-to-light distillates and a higher demand for heating oils, a condition to be eventually offset by increasing demands for light petroleum products in petrochemistry, increased use of motor vehicles, and greater availability of natural gas. Future projects call for preliminary gasification under pressure, which can lead to the formation of hydrogen sulfide gas. Hydrogen sulfide liberated from the gasified fuel is more easily captured than SO_2 in the exhaust gases, and lends itself more readily to the manufacture of elemental sulfur to be sold as a by-product. Gasification provides a fuel gas that can be highly varied in composition, with almost no additional expenditure of power. By making use of the chemical and physical enthalpies of these gases, the yield of the modern heating plant can be raised by 5-15%, plus compensations from the sale of by-products.

16537

Fujiwara, Masahiro

AIR POLLUTION CONTROL IN ALUMINIUM WORKS UNDER ALKALI AND WORKS REGULATION ACTS IN ENGLAND AND WALES. (Eikoku no arukariho ni motozuku aruminyumu kojo niyoru taikiosen boshi gyosei). Text in Japanese. Kogai to Taisaku (J. Pollution Control), 3(3):13-15, March 15, 1967.

Air-pollution control in England is based on the Alkali and Works Regulation Acts and the Clean Air Act. The country is divided into seven Alkali Inspectors' Districts administered by 25 inspectors who maintain close contact with local health and smoke inspectors. The annual reports compiled by the inspectors form the basis of the Manual Reports submitted to the Ministry of Housing and Local Government. These reports contain the air pollution plans and policies currently in practice. The contents of the Manual Report of 1960, 1964, and 1965 are summarized. Though England does not have a primary aluminum refining industry, it has aluminum manufacturing industries which mainly treat aluminum scraps. Air pollution problems due to aluminum manufacturing, and countermeasures, are discussed in the 1960 Manual Report. A number of plants found venturi scrubbers unsatisfactory for reducing smoke emissions. Better results were obtained by rinsing the aluminum scrap and discharging smoke from taller stacks. The 1964 Manual Report shows that the problem of an oily smoke was partly solved by afterburners and that of fumes solved by employing hearth furnaces (flat type) which do not require flux. The reports emphasize the cooperation between legal authorities and industry. This approach to practical control measures has implications for countries which are trying to control air pollution by legal means alone.

16549

Kageyama, Hisashi

PRESENT STATUS AND FUTURE PROSPECTS OF AUTO EXHAUST CONTROL. (Jidosha haishutsu gasu taisaku no genjo to doko). Text in Japanese. Kogai to Taisaku (J. Pollution Control), 4(7):405-409, July 15, 1968. 3 refs.

In Japan, some progress in controlling auto engine exhausts has been realized as the result of control measures introduced in 1966. For example, despite increasing traffic, there has been a decrease in the CO detected at intersections due to improvements in the road system and the traffic environment. Improvement of the traffic environment and efforts to find alternative control methods are discussed. Alternatives involve such practical steps as restrictions on traffic, improvement of automobile structure and functions, and city planning. Another approach has not yet been adopted by any other country. Conventional tests on auto exhaust gas are directed toward measuring gas emissions from prototype engines. It is obvious, however, that the problem of exhaust gas becomes more serious as the number of automobiles increases. Therefore, revision of the present auto inspection standard is underway. Owners of automobiles are required to have their cars inspected periodically at six month intervals. With the new inspection standard, 30% decrease in total CO gas emission is expected in comparison with that obtained by the regular test.

16630

Muschelknautz, Edgar

STUDIES OF CENTRIFUGAL SEPARATORS. (Untersuchungen an Fliehkraftabscheidern). VDI (Ver. Deut. Ingr.) Ber., no. 115: 124-128, 1967. 7 refs. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 17p., Sept. 23, 1969.

Cyclones are used for separating solid particles from gases, although smaller and less expensive facilities would to the same job. The annular slot separator is illustrated and its operating principle is described. Water canal experiments were performed for the design of the annular slot separator; stream lines and particle paths are illustrated. Experiments with a small model separator (diameter 125 mm) at which the slot width of the conical rings could be changed, were performed and results as function of the collection efficiencies for certain particle sizes are tabulated. With an annular slot separator made of spring wire, which has a mean slot width of 1 mm, a total collection efficiency of 95% was obtained with the same dust. Very narrow slots around or below 1 mm are permissible only with dusts which have no tendency to adhere. The deflection separator is illustrated. The air is deflected at the end of the tube conveyor by 180 deg with the aid of secondary air. By the centrifugal movement of about 30,000 m/sec imparted on the air, all particles are thrown out, despite the very short residence time (only several ms). Particle size collection efficiency of a deflection separator with air injection into the boundary flow is tabulated.

16937

Miczek, Gerhard

COMPARATIVE INVESTIGATIONS WITH CYCLONE SEPARATORS. (Vergleichende Untersuchungen an Zyklonentstaubern). Staub (Duesseldorf), 20(9): 39-43, Jan. 1960. 3 refs. Translated from German. 16p.

The total collection efficiencies were determined with the same dust but at various pressure losses, for the four cyclones Van Tongeren, Korsa, the cyclone with counter-current flow and vanes, and the cyclone with the helical plate covering. Measurements were performed under the following conditions: the specific throughputs were constant, the maximum diameters of the whirling chambers were the same as the conical parts of the chambers, the total lengths of the cyclones were equal, and the settling chamber and the cyclone outlet into that chamber remained unchanged. Under those conditions, the collection efficiency was practically the same for all cyclones. A comparison of designs also showed that the investment costs are practically the same The existing minor differences diminish still further when the costs for a series of collectors are considered, since all structural features including the dust feeder, the settling chamber, and the removal system can be constructed alike. Only the cyclone with the helical plates will be less expensive. The Van Tongeren cyclone requires slightly more space. As far as wear and tear is concerned, the small cyclones with tangential inlets are not particularly advantageous. The cyclone with vanes and counter-current flow offers a better resistance in this respect. The economy of cyclone separators, particularly with in-series designs, depends first and foremost on the specific throughput and the selected pressure loss and hardly on the design of the individual cyclone. (Author conclusions modified)

17022

Lohs, Wolfgang

MANUFACTURE OF AEROSOLS AND SEPARATION OF ULTRAFINE DUSTS IN SPRAY WASHERS. Staub (English translation from German of: Staub, Reinhaltung Luft), 29(2):43-48, Feb. 1969.

Fine and unltrafine dusts for scrubbing tower experiments were generated by compressed-air atomization of a 5 wt% sodium sulfate solution with subsequent drying. The solution was led to an injector needle of an atomizer nozzle and passed through a swirl body with axial flow to a turbulence chamber tapering conically toward the nozzle mouth. The translational and rotational energy of the air was increased by the chamber shape. Maximum energy for atomizing a droplet was obtained by metering it through the atomization zone entrance through which air from the turbulence chamber excaped. When the separation of hydrophilic sodium sulfate and hydrophobic particles was tested in a spraying tower, fine particles were found to follow the flow line around the water droplet and to remain in the carrier gas. Only 10-50% separation efficiency was obtained with hydrophilic dust particles below 0.5 micron. Values for the separation of hydrophobic dusts were even lower. The separation of 0.3-0.5 micron particles was improved up to 60% by the condensation of vapors at the particles (nuclei condensation). The separation of the hydrophobic dusts was improved 20% by pretreatment with wetting agents.

17067

Ariyoshi, Tsuyoshi

DISPOSAL OF HYDROGEN SULFIDE AND SULFUR RECOVERY IN PETROLEUM REFINERY. (Sekiyu seisei kojyo ni okeru ryuka suiso no jogai to ion kaishu no jissai rei). Text in Japanese. Kogai to Taisaku (J. Pollution Control), 2(7):467-472, Aug. 15, 1966.

Most of the crude oil imported by Japan is from the Middle East and contains 1.5 to 3% sulfur. As an example, purification of a crude oil yielded the following results: volatile oil, 0.05% sulfur; kerosine, 0.15%; light oil, 0.45%; number 1 A heavy oil, 0.3%; B heavy oil, 2.1%; number 1 C heavy oil, 0.95%; and number 4 C heavy oil, 3.0%. Sulfur compounds contained in crude oil are mercaptans, aliphatic sulfurs, bisulfur compounds, thiophene, and so on. Hydrogen sulfide is not an important component, but sulfur compounds change to hydrogen sulfide by decomposition or hydrogenation in the course of purification. Hydrogen sulfide is removed by absorption by alkanolamines such as monoethnolamine, diethanolamine, triethanolamine, methyl triethanolamine, and diisopropanolamine. Hydrogen sulfide absorbed by an amine is stripped by hot steam. Sulfur is obtained by partial combustion of the hydrogen sulfide. One-third of the hydrogen sulfide is burned and converted to sulfur dioxide which reacts with the remaining two-thirds to generate sulfur.

17113

Schackmann, Heinrich

RECENT DEVELOPMENTS IN THE TREATMENT OF NON-FERROUS METAL- CONTAINING ROASTED SULFUR ORE. (Neuere Entwicklung bei der Aufarbeitung NE-Metallhaltiger Schwefelkiesabbraende). Z. Erzbergbau Metallhuettenwesen, 20(11):499-511, Nov. 1967. 35 refs. (Presented at the General Meeting of the Association of German Metal and Mining Industries, Salzburg, June 2, 1967.) Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 38p., June 11, 1969.

Four examples from the roasting process with chlorine demonstrate how the treatment on nonferrous ores has been changed to meet the demands of the metal industries. The percolating leach, the roasting process, the sulfur dioxide percolation, and the reduction of the Fe concentration in the waste water are discussed. The concentrations of elements remaining after roasting with chlorine are listed and discussed. The new method of volatilization with chlorine, applied to non-ferrous residues poor in metal, is described. In addition, the results achieved by an experimental plant with a capacity of 100 tons/day is discussed. Numerous charts on statistics, flow charts of various systems, and illustrations are given.

17186

Niizu, Yasushi, Akira Yoshikawa, and Sadao Kubota

A STUDY OF THE FILTRATION OF SUBMICRON DUSTS. 4TH REPORT: A THEORETICAL ANALYSIS OF FILTRATION EFFICIENCY. (Sabumikuron jinai no roka nikansuru kenkyu. Dai 4 po Rokakoritsu no rironteki kaiseki). Text in Japanese. Kukichowa Eisei Kogaku (J. Japan Soc. Heating Air Conditioning Sanitary Engrs.), 43(9): 797-805, Sept. 25, 1969. 19 refs.

A theoretical analysis of the dust catching efficiency of a single fiber was performed and good agreement with experimental measurements was obtained. Using the assumptions that the dust particle is spherical; the filter fiber, cylindrical; the fiber surface, clean; that the particle adheres to the fiber surface; and that the electrostatic force is negligible, together with gravity and chemical reaction, an approximate solution of Oseen's equation of fluid motion was calculated by a large-scale computer. Effects of inertia and diffusion were taken into consideration when calculating the efficiency. The experiment was performed on a packed layer of filters, and the result was modified for a single fiber. The quantitative agreement between the theoretical and experimental calculations suggests that the dust collecting efficiency of the packed filter in practical use can be estimated with little error from the theoretical calculation of the diffusion and inertia. The tendency of the experimental value to exceed the theoretical one is attributed to the neglect of electrostatic effects and so forth. A study of those effects is currently in progress.

17262

Yanagihara, Shigeru

AIR POLLUTION AND FUTURE AUTOMOBILE ENGINES. (Kogai mondai to shorai no gendoki). Text in Japanese. Jidosha Gijutsu (Automobile Eng.), 23(11):1174-1183, 1969. 7 refs.

The prospects for reducing emissions from internal combustion engines or developing alternative engine systems are reviewed. Internal combustion engines, which include Otto, Diesel, and Brayton cycles, are divided into reciprocal and rotary types. The engines have 2 or 4 cycles or in the case of hybrid engine, a mixed cycle. Theoretically, the exhaust gas composition can be less than 25 ppm hydrocarbons, 0.25% carbon monoxide and 100 ppm nitric oxide. In practice, however, the minimum reduction attainable is twice as much, with control devices costing from $50 to $300. Replacement of the gasoline engine with other types of internal combustion engine is not realistic, and improvements in the control of exhaust gas are aimed at the present-day gasoline engine. Gas turbines emit fewer pollutants than other prime movers, but their use, especially for vehicles less than 200 hp, is rather limited. Steam engines and stirling cycles are remote alternatives; they will not replace gasoline engines in the near future. For the electric car, an alternating-current motor is promising. Advantages and disadvantages, of lead-acid, Na-S, and $Li-Cl_2$ cells are discussed, together with a fuel cell of H_2-O_2, hydrocarbons, methanol, ammonia, or hydrazine. An energy-to-weight ratio of fuels is another important factor is considering future automobiles. Gasoline or kerosene have the best value. Hydrogen has a value of 1/2 the ratio of propane, even when used as a magnesium hybrid. In conclusion, improved exhaust-gas cleaning techniques are required for the internal combustion engine.

17289

Matsumoto, Hiroyasu

REMOVAL OF SULFUR DIOXIDE FROM FLUE GAS THROUGH TURBULENT CONTACT ABSORBER. (Tahbyurento abuzohba ni yoru haien no datsuryuh). Text in Japanese. Netsu Kanri (Heat Management: Energy and Pollution Control), 22(1):22-29, Jan. 30, 1970.

The problems of sulfur dioxide pollution were solved by direct desulfurization of heavy oil and exhaust gases, and diffusion from tall chimneys. Absorption in an absorption column was described. The packed column and spray column which are usually used have many faults. Spray nozzles become clogged and their cleaning requires too much time. The apparatus becomes large for treating large quantities of gas and requires frequent maintenance. The inclination of flaw lowers the efficiency. A turbulent contact absorber solves the above problems. It has two grids at the upper and lower parts of the absorption column and light plastic balls are packed among them. Gas is blown from the lower nozzles and the absorbent is sprayed from the upper nozzles. The plastic balls move violently by the impaction force of the gas and liquid. The plastic balls are covered with new absorbent enabling them to absorb gas. The column does not become clogged because of the cleansing effect of the moving balls. The absorbent is usually an alkali solution or sea water. The desulfurization rate of this method is higher than 90% for 90,000 N cu m of exhaust gas per hour.

17402

Hashimoto, Kiyotaka

THE POINT OF PLANNING AND ITS EFFECT ON OPERATION RESULT OF AN ELECTRIC PRECIPITATOR IN VARIOUS INDUSTRY SMOKE ABATEMENT (V) -- AIR POLLUTION IN CERAMIC INDUSTRY. (Gyoshubetsu ni miru denkishujinsochi no setsubikeikaku to untenkoka (V) -- Yogyohin seisan ni tomonau haigasu no jogai). Text in Japanese. Kogai to Taisaku (J. Pollution Control), 3(3):165-174, March 15, 1967. 28 refs.

Dust generated in the manufacturing of cement is high in electric resistivity and has an erosive property. A rotary dryer generates high amounts of dust whose apparent resistivity varies considerably with the treatment of the raw material. A rotary kiln generates dust the apparent resistivity of which is high. By considering such variabilities, an effective dust collecting system can be designed. Dust generated by a packer is a part of the final product and has to be precipitated and collected by a special dust collector. An electric precipitator is usually controlled by reading the voltage of the transformer and the amperage of the discharge-amperemeter. For the most effective operation of the precipitator, a precipitative voltmeter has to be used. The spark-count controlling method can be adopted for the dust of low resistivity. Plumes or smut result when precipitating efficiency is not satisfactorily high. In the carbonic industry, the production of electrodes for metal refining and other purposes and the production of carbon black have to be considered first with respect to air-pollution prevention. Dust generated in the manufacturing of electrodes is low in electric resistivity, has little cohesive power, and contains some higher- boiling hydrocarbon; thus, a stabilizer is necessary. Dust generated in the manufacturing of carbon black can not be precipitated by an electric precipitator because of its special properties, but it can be precipitated by a special unit system of dust collectors. In other parts of the ceramic industry, it is easy to precipitate dust by an electric precipitator, but most of the factories are small in scale so special methods of treatment are necessary.

17463

Hoeke, Bert and Horst Arnim Wittbold

WASH SOLUTION FOR PURIFYING FLUORINE-CONTAINING WASTE GASES IN ALUMINIUM INDUSTRY. (Waschloesung zur Reinigung fluorhaltiger Abgase in der Aluminiumindustrie). Text in German. Wasser Luft Betrieb, 14(1):24-29, Jan. 1970. 7 refs.

The separation of fluorine compounds and dust from waste gases of aluminum plants was studied in the laboratory. A suitable scrubbing liquid was determined for the waste gas; the developing compounds had to be soluble to avoid crystallization in the dust collectors and on pipes. Four test series were carried out with a rotating wet collector. The fluorine compounds could be removed to a large extent with an alkaline scrubbing liquid. A slight dependence of the degree of efficiency on the pH value of the scrubbing liquid was observed. At pH 8 to 12, the gaseous fluorine compounds could be removed to a residual concentration of less than 0.5 mg/standard cu m. The salt content of the circulating scrubbing liquid increased in the course of the experiments to a maximum of 64 g salt/liter water. The fluoride content of the scrubbing water reached 7 g F/l. Maintenance of a pH of more than 10.5 and a salt content of less than 70 g/l helped to prevent any incrustations. This necessitated periodic replenishment of the spent scrubbing liquid by fresh water. The spent liquid was treated with aluminum salts to precipitate the fluoride in the form of kryolith. The dry precipitant contained between 48 and 51% F which could be reused. The sludge collecting in the circulating scrubbing liquid had a settling time of 2 hours. Flocculants did not reduce this settling time. The water content of the sludge was 98%.

17539

Umeda, Hiroyuki

POINTS AT ISSUE IN THE DESULFURIZATION OF HEAVY OILS. (Juyu teiioka no mondaiten). Text in Japanese. Nenryo Oyobi Nensyo (Fuel and Combustion), 36(12):1179-1188, Dec. 1, 1969. 8 refs.

Because the desulfurization of heavy oil is an important aspect of air-pollution abatement, plants for the hydrodesulfurization of distillate oils (naphtha, kerosene, light oil) are often considered indispensible. In the United States, the hydro- decomposition method is finding rapid acceptance. The demand for high-quality gasoline promoted the development of the high-pressure, steel forming, and the partial-oxidation method for the production of high-purity hydrogen. These techniques are applied in both indirect and direct desulfurization processes, many of which have been introduced in Japan. Flow charts are presented to illustrate direct and indirect processes as used alone or in combination. Desulfurization by reduced pressure distillation is a typical indirect desulfurization method. A straight asphalt is obtained at the bottom of the reduced pressure flash tower; its sulfur content is high. If this asphalt can be sold at a profitable price, it will be a large gain to the desulfurization of heavy oil in the oil factory. Also included are a direct residual-oil desulfurization method and an indirect method which uses desulfurization equipment on reduced pressure residual oil. It is concluded that the general trend is toward the direct desulfurization, although an optimum combination of the direct and indirect methods should be considered.

19234

Iwata, Yoshiaki

PRODUCTION PRINCIPLE OF PERFECTLY CLEAN AIR AND A COUNTERMEASURE FOR THE PREVENTION OF

PUBLIC NUISANCE. (Kanzen seijo kuki no seizorinen to kogai bojo no issaku). Text in Japanese. Kuki Chowa Eisei Kogaku (J. Japan Soc. Heating, Air Conditioning and Sanitary Engrs.), 44(5):365-370, May 25, 1970.

A new method of cleaning air by adsorption with artificial rain is presented. The basic idea is to remove ultra-fine particulates of less than 0.3 micron from air by forming a mist. The particulate becomes the nucleus of a water droplet, seen in rain or snow. Outside air is mixed with room air and led to the primary air-cleaning chamber, where most of the pollutants are removed by humidification. After heating, the air is humidified in the secondary air-cleaning chamber which is equipped with a heat exchanger. When the humid air near the saturation point is cooled, a temperature decrease does not occur in water vapor because of its large latent heat. Solids such as dust, however, are quickly cooled because of their low latent heat, and absorb the heat of the supercooled vapor. Thus the dust is covered with water, the water droplet grows in size as cooled, and falls downward. The small size of the initially formed water droplets, and the low temperature and humidity of the ambient atmosphere are the main features of this system, enabling the removal of ultra-fine particulates and gaseous pollutants. This method was contemplated in 1967, a patent application made in 1968, and brought into operation for a large electronic factory in the summer of 1969.

19403

VDE (Verein Deutscher Eisenhuettenleute), Duesseldorf, Germany

DUST EMISSION CONTROL, STEEL WORKS (BROWN SMOKE) OXYGEN-BLOWN STEEL PROCESSES, CONVERTER. (Staubauswurfbegrenzung Stahlwerksbetrieb (Brauner Rauch) Sauerstoffaufblasverfahren, Konverter). VDI (Ver. Deut. Ingr.) Richtlinien, no. 2112, June 1966, 36 refs. Translated from German by H. Schneider, Isreal Program for Scientific Translations, Jerusalem, 12p. CFSTI: TT 68-50469/6

The advantages of using oxygen for steel production have led to the development of a number of new metallurgical processes, one of the most important being the oxygen converter process wherein oxygen is blown on a metal bath that is charged into the converter from a blast furnace or cupola. Dust in converter gases is generally known as 'brown smoke'; it consists mainly of vaporized iron oxides and manganese oxides, as well as vaporized slag components. Measures to be applied during the blowing period in the converter and designed to reduce the emissions of brown smoke by modification of charge compositions or converter operation are unfeasible with one exception. To keep dust emissions within desirable limits, converter waste gases must be cleaned. Three collectors discussed are filters, electrostatic precipitators, and wet scrubbers. The operating factors influencing the separation efficiencies of these methods are noted. To be suitable for the process, the collectors should have an efficiency of 98%. It is further recommended that each converter be provided with its own waste gas stack from which gases are led by a cooling unit to the collector. Oxygen-blown converter plants should also be equipped with stack flares to insure the ignition of CO-containing waste gases.

19407

Perotin, J. P. and B. Werderer

RADIOACTIVE CONTAMINATION IN WORKSHOPS AND LABORATORIES. VOLUME II. COLLECTIVE PROTECTION TECHNIQUES. Commissariat a l'Energie Atomique, Saclay (France), Groupe Chimie et Effluents, Rept. SPR/67-558, 1967. 78 refs. Translated from French by E. M. Gillis, Atomic Energy Research Establishment, Harwell (England), Information Branch, 92p., 1968. CFSTI: PB 185821-T

Studies and experiments are reported relative to the general properties of radioactive contaminants and the characteristics of atmospheric contamination. The control of atmospheric contamination was approached from the point of view of localizing contamination and conducting it through controlled channels to a point where it can either be collected or diluted sufficiently prior to its releases to the atmosphere to eliminate any possibility of external contamination. The physical and chemical contamination of surfaces is also discussed, along with measures for their prevention.

19523

Brandt, H.

DUST REMOVAL FROM BITUMINOUS MACADAM MIX REFINING PLANTS. (Die Entstaubung der Aufbereitungsanlagen fuer bituminoeses Mischgut des Strassenbaues). Text in German. VDI (Ver. Deut. Ingr.) Ber., no. 149:418-426, 1970. 10 refs.

About 50 million tons of bituminous macadam mix is produced annually in West Germany, in 1800-2000 stationary and mobile plants, releasing more than 1 million tons of dust which need to be processed by separators. The mineral constituents, grain size 0-35 mm, are continually dried and heated in a stream of flue gases from a rotary kiln. The finer particles become suspended in this stream of gas and must be removed from it so as to conform to legal regulations. A federal regulation of September 1964 sets the maximum acceptable emission level at 150-750 mg/cu Nm, varied according to the quantity of flue gas. The limit for dust of less than 10 microns is 150-300 mg. A regulation of the Province of North Rhine-Westphalia of October 1967 sets limits according to 5 categories of gas dust content. The dust content of the flue gas depends on the granulometric fineness of the raw material and on the rate at which the gas flows through the kiln. Measurements show that unwashed material produces 150 g/cu Nm, a mixture of washed and unwashed material yields 70 g, and washed material, 40 g. Kilns can be protected against improper packing or overloading, and the supply of gas fed to the kiln can be limited to the amount actually necessary for efficient operation, which will discourage personnel from using improper procedures. Measurements made in 1968 at 13 plants indicate that the type of mineral used has a negligible influence on the amount of dust produced. The present state of technology has no solution for the problem of flue gases containing more than 150 g/cu Nm, which necessitates controlling production procedures in such a way as to keep below this limit. Scrubbers are usually adequate for purification of the emissions, with bag filters or electrostatic filters for especially large plants.

19581

Kamino, Yasumi, Shigenori Onizawa, Kenji Yasuda, Masaaki Miyaji, Yoshihide Kawamura, and Akira Inoue

REMOVAL OF SO2 IN EXHAUST GAS BY THE STEAM-GENERATED ACTIVATED CHARCOAL PROCESS (I). REPEATED ABSORPTION-DESORPTION EXPERIMENT AND ECONOMIC EVALUATION OF THE PLANT. Hitachi Shipbuilding Co. (Japan), p. 1420, 1969 (?). Translated from Japanese. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 2p., Oct. 30, 1969.

In bench-scale tests of the steam-generated activated charcoal process, the removal rate of sulfur dioxide was observed with and without air treatment. The air treatment, which comes between the desorption and absorption states, consists of passing air containing water at 100-200 C through the absorption-desorption tower for one hr, followed by dry air for 30 min. The treatment enabled the charcoal to absorb 90% of the sulfur dioxide even after repeated use. The apparatus and operating conditions required for application of the activated charcoal process to a 250,000 kWH power plant are noted.

19616

Ludwig, Gerhard

ENERGY IN THE CHEMICAL AND PETROLEUM PROCESSING INDUSTRY. MORE RECENT RESULTS IN THE FIELD OF COAL TREATMENT. (Energie in der chemischen und erdoelverarbeitenden Industrie. Neuere Ergebnisse auf dem Gebiet der Kohlenveredlung). Text in German. Brennstoff-Chem. (Essen), 50(1):T1-4, Jan. 1969.

A review of three papers presented at the meeting of the Hard Coal Mining Association in Essen between Oct. 29 and 30, 1968 is given. The first paper dealt with mining and coke production; the second, with methods for reducing the sulfur content in coal; and the third, with specific details of coking plants (type of coke ovens, etc.). In the past few years, the average sulfur content in the coal mined in the Ruhr Valley amounted to 1.12%. The fraction of organically bound sulfur amounted to 40%, and 60% of the total sulfur content is bound to iron. There are wet and dry coal desulfurization methods. Of the various wet methods, floatation was best suited for removal of the pyrite grains with less than 0.5 mm diameter. The wet-operating vibrating screen was best suited for pyrite between 0.06 and 3 mm and the settling tank for material above 1 mm. The dry methods are not as efficient as the wet methods, but they are used in West Germany because 40% of the hard coal ready for use is dry. With a magnetic separator with a field strength of 18,000 gauss, the sulfur content in the grain size class of 1 to 0.1 mm could be reduced from 2.8 to 1.6%. This was accompanied by a carbon loss of 14.9%. With laundering, the sulfur content could be reduced, in favorable cases, to 33.7% and in unfavorable cases to 76.2% of the intial content.

19746

Langhoff, Josef and Werner Peters

POSSIBLE SOLUTIONS AND EXPERIMENTS TO REDUCE THE SULPHUR CONTENT IN COKE. (Moglichkeiten und Versuche zur Verminderung des Schwefelgehaltes im Koks. I.). Brennstoff-Chem. (Essen), 50(5): 149-154, 1969. 11 refs. Translated from German. Belov and Associates, Denver, Colo., 27p., April 3, 1970.

Sulfur occurs in coal in organically and inorganically bound forms. The inorganically bound sulfur appears as pyrite and markasite. About 65% of the coal-sulfur is organically bound. There are several possibilities for lowering the sulfur content in coke, including electrostatic and magnetic separation; treatment with gaseous, fluid, and molten reagents; decomposition by bacteria; introduction of solids or reducing or oxidizing gases during the coking process; and thermal decomposition of the coke. Another solution is the removal of the coal-sulfur by reduction or hydration with hydrogen during pyrolysis. By providing an excess of H2 at the moment of decomposition or rearrangement of the sulfur compounds, the formation of hydrogen sulfide and its simultaneous removal with the volatile components is assisted. This method is particularly well suited for the coking of fine coal in a rotating bed. Each grain of coal or coke is surrounded by the reaction gas, the effective surface presented to the gas is much higher. The possibility of H2S recombining with the solid particles to organically or inorganically bonded sulfur is limited by the rising effect of the carrier gas. Sulfur removal is better with an increasing length of stay and gas speed and with a reducing coke grain size. A temperature of about 800 C is optimal.

19852

Kamino, Yasumi, Shigenori Onizuka, Kenji Yasuda, Masaaki Miyaji, and Yoshihiko Kawamura

REMOVAL OF SO2 GAS IN EXHAUST GAS BY STEAM-GENERATED ACTIVATED CHARCOAL PROCESS (II). ABSORPTION OF SO2 GAS IN EXHAUST GAS BY ACTIVATED CHARCOAL. Translated from Japanese. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 3p., Oct. 30, 1969.

In a comparative study of the absorptive efficiences of four kinds of activated charcoal (AC-Q, AC-Gl, AC-Sh, and AC-C) for sulfur dioxide, the saturation value of absorption was determined by thermal balance measurements. In addition, the effects of gas velocity and SO2 concentration and water content on absorption were evaluated. The results show that AC-Q is superior to the other activated charcoals and that the removal rate of SO2 is a function of time of absorption and volume of treated gas.

19859

Hirose, K., I. Yano, and S. Mikami

STUDY ON REFINING SULFUR BY FLUIDIZING METHOD. (REPORT NO. 1). SO2 GAS REDUCTION IN A FLUIDIZED BED. Kogyo Kagaku Zasshi (J. Chem. Soc. Japan), 63(6):906-911, 1960. 15 refs. Translated from Japanese. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 20p., Nov. 5, 1969.

As part of a study of the refining of sulfur from pyrite ores by fluidization, reduction of sulfur dioxide gas by coke in a fluidized bed was investigated. The effects of reaction temperature, gas composition, gas flow rate, and the volume of coke on the reduction reaction were examined. Above 1000 C, a 100% reduction of sulfur dioxide was obtained by prolonging the period of gas-coke contact. However, hydrogen sulfide, carbonyl sulfide, and carbon disulfide were formed as the result of simultaneous side reactions. These side reactions were minimized by reducing the reaction temperature and extending the contact time still further, but sulfur yields were not satisfactory. Complete conversion of sulfur dioxide to sulfur appears to require its reaction with hydrogen sulfide or carbonyl sulfide. Experiments were also performed in a fixed bed. The fixed bed data and the fluidized bed data were compared and mathematically analyzed to determine the quantity of sulfur dioxide reduced by the coke and the quantity reduced by the carbon monoxide formed from the carbon dioxide generated by the coke. The effect of flow conditions on reduction rate coefficients is discussed.

19860

Tamura, Zensuke, Yukio Hishinuma, and Teruo Hisamura

DESULFURIZATION PROCESS OF FLUE GAS BY ACTIVE CARBONS. (Kassaitanho hai gasu datsuryu). Hitachi Hyoron, 49(11):53-57, Nov. 1967. 3 refs. Translated from Japanese. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 22p., Nov. 4, 1969.

In a Japanese process for desulfurizing flue gas, sulfur dioxide is adsorbed by activated carbon which is regenerated by washing and drying. A standard operating cycle including adsorption, washing, and drying is 60 hrs. A 90% desulfurization rate was obtained when the process was operated for about 2300 hrs (60 cycles) in a test plant. No weakening in the adsorptive capacity of the carbon was observed and dilute concentrations of 20% sulfuric acid were obtained continually from the washing water. The method is to be tested again in a large-scale pilot plant. Advantages claimed include excellent flue-gas diffusion, since the exothermic adsorption reaction maintains stack temperatures in excess of 100 C, reclamation of sulfuric acid and sulfates from the wash water, conservation by re-use of washwater, and adaptability to existing boiler structures without boiler modification. Several other dry methods of desulfurization are also described.

19959

Hirose, R. and K. Uno

DESULFURIZATION OF EXHAUST GAS BY ACTIVATED MANGANESE OXIDE. Karyoku Hatsuden (Thermoelectric Power Generation), 18(4): 355-360, April 1967. Translated from Japanese. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 17p., Dec. 3, 1969.

A method for removing sulfur dioxide from power plant emissions by activated manganese oxide is described. The method involves adding powdered activated manganese oxide to the exhaust gas flow, then oxidizing the gas in a slurry containing ammonia. The manganese oxide can be regenerated, and ammonium sulfate is recovered as a by-product. The advantages of this system include a high SO2 absorption rate; recycling of the manganese oxide; low pressure drop; desirable operating characteristics, and recovery of ammonium sulfate.

19972

Central Electric Experimental Station (Japan), SO2 Specializing (Limited) Dept

EXPERIMENTAL REPORT ON THE ELIMINATION OF SULFUROUS ACID GAS BY INJECTION OF LIMESTONE AT MIE POWER STATION. (TEST RESULTS OF LIMESTONE INJECTION AT MIE POWER STATION). Oct. 25, 1967. Translated from Japanese. Belov and Associates, Denver, Colo., 57p., May 15, 1970.

The results of a series of tests to determine the ability of limestone powder to remove sulfur dioxide from power plant effluent are discussed. Various conditions, such as making the injection particles as small as possible, using limestone with 1% or more iron content, scattering the powder evenly in the boiler, and placing injection points on the chimney where the temperature is between 1000-1200 C, greatly enhanced the rate of removal. With a ratio of limestone to crude oil of 15% by weight, the removal efficiency is 50-60%. Dust accumulation on the interior walls of the boiler, and especially on the reheat tube, is great. Further work is required to eliminate this problem. (Author abstract modified)

20090

Sato, Takeo

LOW SULFUR CRUDE OIL. (Teiio genyu). Text in Japanese. Nenryo Kyokaishi (J. Fuel Soc. Japan, Tokyo), 49(515):116-122, March 1970.

To meet new restrictions on the allowable sulfur content of fuel, Japanese oil companies are increasing their imports of low-sulfur crude and heavy oil and installing more plants for the hydrodesulfurization of heavy oil. According to government projections, the hydrosesulfurization facilities will be required to have a capacity of 650,000 BSD by 1973. The present capacity is 65,000 BSD. The current capacity of indirect desulfurization plants is 220,000 BSD. The ratio of low-sulfur crude oils to the total volume of crude oils must increase from 12% in 1968 to about 20% by 1973. Low-sulfur crude oils, which account for more than 40% of worldwide crude oil output, are effectively and cheaply desulfurized. Judging from their present distribution status, however, it appears unlikely that Japan can substantially increase its imports. It will instead have to rely on the costly desulfurization of heavy oil.

20108

Kotera, Yoshihide

HYDRODESULFURIZATION OF FUEL OIL. (Juyu no chokusetsu datsuryu - ryudosho hoshiki). Text in Japanese. Nenryo Kyokaishi (J. Fuel Soc. Japan, Tokyo), 49)516):197-205, April 1970. 9 refs.

The hydrodesulfurization of fuel oil is examined, and the minor component in fuel oil is tabulated. Engineering problems associated with the 'H-Oil' desulfurization process, performed in a fluidized bed, are described in detail. Hydrodesulfurization studies carried out by the Chemical Industrial Research Institute in Tokyo are discussed with respect to both engineering problems and the choice of catalysts. Date is presented for a 'moving bed' type of process that is expected to be useful in commercial plants. The catalyst employed in this process is Co-Mo-Al2O3, the properties and methods of preparation of which are reviewed.

20223

Lemke, Kurt

PROCEDURE AND MECHANISM TO REDUCE THE PYRITE CONTENT OF COALS FOR THE PURPOSE OF REDUCING THE SULFUR OXIDE CONTENT OF EXHAUST GASES. (Verfahren und Vorrichtung zur Herabsetzung des Pyritgehaltes von Kohle zwecks Verringerung des Schwefeloxydgehaltes von Rauchgasen). (Bergwerksverband G. m. b. H., Essen, W. Germany) W. German Pat. 1,247,981. 3p., Aug. 24, 1967. 5 refs. (Appl. Dec. 12, 1964, 6 claims). Translated from German. Franklin Inst. Research Labs. Philadelphia, Pa., Science Info. Services, 7p., Aug. 10, 1969.

A process is described for the economic removal of pyrite from the finest fractions of coal or pyrite-enriched coal dust. It is based on the disintegration of coal into a light and essentially pyrite-free component and a heavy pyrite-enriched component, followed by the dry separation of the latter component according to its density. In the separation process, thin layers of coal dust are uniformly distributed across the entire width of a vibrator-sluice and guided over it. The sluice comprises a series of vibrating troughs which become successively more narrow and deep. In the course of its path over the troughs, the coal-pyrite mixture spreads out into particles having the same size but varying in weight according to their densities. The pyrite components are collected in end plates attached to the troughs; coal dust is passing over the plates. The collected pyrite is removed by an optically controlled throughput device which operates discontinuously, while the desulfurized coal components are again combined with the light components. The collected dust is used for coal-dust firing. The process has applications both for the treatment of coking dust and the desulfurization of fuel dust for coal firing.

20299

Tajiri, Kei

SCOPE OF FUEL OIL DESULFURIZATION FOR JAPANESE REFINERS. (Juyu datsuryu no genjo to shorai). Text in Japanese. Nenryo Kyokaishi (J. Fuel Soc. Japan, Tokyo), 49(515):123-130, March 1970.

In response to requirements limiting the sulfur content of fuel to 1.7 wt percent, Japanese refineries built topped crude desulfurizers or vacuum gas oil desulfurizers. The refineries are now endeavoring to determine the optimum operating conditions of these desulfurizers to satisfy the more severe sulfur-level requirement which is expected to be set at less than 1.5 percent in the near future. It is noted that no type of desulfurizer can be economically operated at the current price level of fuel oil. Moreover, reducing the sulfur level of fuel oil to less than 1 wt percent will not solve the air pollution problem in densely populated areas where the number of factories burning oil is expected to double. New processes for producing more gaseous fuel must be explored.

20374

Chertkov, B. A.

MASS-TRANSFER COEFFICIENTS FOR SO2 ABSORPTION FROM GASES USING LIME SUSPENSIONS. (Koeffitsiyenty massoperedachi pri pogloshchenii SO2 iz gazpv izvestkovymi suspenziyami). Text in Russian. Khim. Prom. (Moscow), no.7:67-70, 1962. 8 refs.

Data from pilot testing of a packed absorber designed for extracting sulfur dioxide from low-concentration gases using lime suspensions are correlated. With an irrigation solution of pH greater than 6, the resistance of the liquid phase becomes negligible while the total coefficient of mass transfer may be equated to the partial coefficient in the gaseous phase. The coefficients of mass transfer vary proportionally to the first-order change in linear gas flow rate. The dependence of the mass-transfer coefficient on pH of the irrigation suspension over the range 5.3-6.3 and on solid particle content over the range 20-32 wt % is plotted.

20381

Juengten, H.

TECHNICAL EVALUATION OF THE REPORT BY THE SCIENTIFIC RESEARCH INSTRUMENTS CORPORATION, BALTIMORE OF SEPTEMBER 16, 1968; BASIC STUDIES ON SULFUR CONTROL BY MEANS OF COAL GASIFICATION. (Gutachten zum bericht der Scientific Research Instruments Corporation, Baltimore vom 16 September 1968: Basic Studies on Sulfur Control by Means of Coal Gasification). Preprint, Bergbau - Forschung G. m. b. H., Essen-Kray, Germany, 4p., March 31, 1969. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 9p., Sept. 19, 1969.

The technique and results of an experimental coal gasification process are evaluated. Several modified equations are recommended for computing back reactions: these suggest that a limitation to a differential reactor or to a solid bed, in which the concentration of the reacting gas remains constant over the entire bed length, is useful. In interpreting measured results of the gasification process, the following reactions are considered significant: FeS2 + H2 in equilibrium with Fe + H2S at 600-800 deg and the reaction of heterocyclically bound organic sulfur at 600 deg and higher. Further analysis is suggested to determine whether the chemical reaction or the diffusion decides the speed of the above reactions. It is also proposed that CaO dolomitic lime and manganese oxide be considered as acceptors for the process, with reference made to U. S. patents covering these acceptors.

20931

Barth, Walter

FUNDAMENTAL INVESTIGATIONS ON THE CLEANING CAPACITY OF WATER DROPLETS. (Grundlegend Untersuchungen ueber die Reinigungsleistung von Wassertropfen). Staub (Duesseldorf), vol. 19:175-180, MAY 1959. 12 refs. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 21p.

With wet cleaning, the dust-laden gas is mixed with water by some method. In many cases, the water is atomized and injected into a gas flow. These processes are of a hydrodynamic nature, and can be theoretically examined. For a fundamental analysis of the processes, an analytical approach is needed. The cleaning capacity (in the form of the dimensionless parameter as a function of the droplet size, at a gas velocity of 20 m/sec, and for various particle sizes of the dust carried along) is graphically shown. The data indicate that there are certain droplet sizes with which an optimum cleaning capacity can be achieved. With very large and very small droplets, the cleaning capacity becomes zero. The optimum droplet size shifts to increasingly larger diameters with increasing particle size of the dust. The influence of the gas velocity and the droplet size on the cleaning capacity for a certain size of dust particles is illustrated. The collection efficiency increases considerably with increasing gas velocity for both large and small droplets. The improvement in percent cleaning capacity achieved through increasing the gas velocity is much higher for fine dusts than for coarse dust particles. Some practical conclusions for the construction of wet cleaning systems are given.

21031

Brocke, W.

THE MAIN SOURCES FOR SO2-EMISSIONS. (Schwerpunkte der SO2-Emissionen). Text in German. VDI (Ver. Deut. Ingr.) Ber., no. 149:98-109, 1970. 26 refs.

Analysis of the emission sources for sulfur dioxide has shown that emissions will continue to increase over West Germany and in particular the Ruhr Valley until the year 2000. SO2 is estimated to increase from about 3.65 million tons in 1969 to 4.5 million tons in 1980. Traffic and sulfuric acid plants will decrease their emissions, as well as domestic heaters, but power iron ore sintering plants will be major SO2 emission sources. To control these emissions, the sulfur content in heavy fuel oil and to a lesser extent in hard coal must be reduced. In industrial centers only low-sulfur or sulfur-free fuels should be used. In hard coal-fired and sintering plants the wasted gases ought to be desulfurized. Selection of an adequate process should not only reduce the SO2 emissions but also fluoride compounds, the oxides of nitrogen and polycyclic aromatics.

21119

Remmers, Karl and Rolf Bingel

THE IMPORTANCE OF GAS DISTRIBUTION IN ELECTROSTATIC PRECIPITATORS. (Die Bedeutung der Gasverteilung im Elektrofilter) Staub (Duesseldorf), vol. 19:422-424, 1959. 5 refs. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 11p.

It is important to distribute the gas flow from the feed lines as uniformly as possible over the cross section of the electrostatic precipitator with either horizontal or vertical flow arrangement. To avoid collection efficiency losses with new plants, it is advisable to conduct experiments with three-dimensional models. In such models, the velocity distribution over the precipitator cross section can be measured eally with a flowmeter. The collection efficiency as a function of the flow velocity for a three-stage electrostatic precipitator is shown. Velocity profiles in the precipitator model with gas distribution vanes and without installed gas distribution plates are illustrated. Computation of the collection efficiency loss at varying gas velocities in the invididual precipitator stages is tabulated. For a filter with straight gas feed, the separation loss is represented as a function of the number of gas distributor plates.

21324

Kato, Yujiro

PLANS AND OPERATIONAL EXAMPLES ON FILTER TYPE DUST COLLECTOR SYSTEM AT VARIOUS INDUSTRIES (VI). THE ROLE OF BAG FILTERS IN THE METALWORKING INDUSTRY. (Gyoshubetsu ni miru rokashiki shujin sochi no keikaku to unten jisshi rei (VI). Kinzoku kogyo ni okeru baggu firuta). Text in Japanese. Kogai to Taisaku (J. Pollution Control), 4(10):663-668, Oct. 15, 1968.

The operational conditions of bag filters used for emission control in the metalworking industry are illustrated by examples. In the zinc refining industry, bag filters are used at various points. The baghouse for the independent electric power plant which is provided to allow the exhausted material to cool down is one example. Another is the baghouse for controlling emissions from a smelting furnace exhaust. The applications of bag filters to the aluminum industry is illustrated by the baghouse used to control emissions from an alumina coveying process. In a powdered lead manufacturing plant, a complete dust collector has to be provided since the lead dust is extremely toxic and cannot be allowed to escape into the atmosphere. Complete hooding is also necessary. In the nonferrous metal working industry, emissions are commonly worth recovering. High efficient dust collectors are adequate for this purpose. In the iron and steel industry, the collected material from the exhaust is generally of little value, but dust collectors are necessary for air pollution control. Their use is typified by baghouses equipped for controlling emissions from electric-arc steelmaking furnaces and from electric furnaces for ferro-alloy manufacture. In the metal processing industry, bag filters are also used for controlling emissions from various processes. An example is the baghouse equipped for controlling emissions from the finishing process of iron casting.

21643

Ohtsuka, Tadao, Osamu Shimoda, Teruo Yatabe, Kuinio Sugino, and Kenji Tanaka

INJECTION TEST OF AMMONIA GAS AND DOLOMITE POWDER INTO OIL-FIRED BOILER. Nippon Kokan Giho (Tokyo), vol. 5:17-24, 1962. 7 refs. Translated from Japanese. Belov and Associates, Denver, Colo., 26p., April 16, 1970.

Tests were conducted to develop a means of counteracting the accumulation of NH4HSO4, a combustion by-product with a low melting point, in the air-heater of oil-fired boilers. The compoun is formed when ammonia gas is injected into the combustion gas to neutralize sulfuric acid produced by the combustion of sulfur- bearing fuels. The ammonia injection temperature zone is an important factor in this method. Accordingly, ammonia injection was applied to a boiler in a thermal power plant for one month, using an injection rate of 0.6/0.07 wt % of fuel oil fired, and an injection temperature zone of -180 C in the flue gas. A satisfactory reduction of NH4HSO4 accumulation was obtained under these operating conditions. Experiments were also conducted on the effectiveness of dolomite powder injection in reducing corrosion caused by sulfuric acid in the combustion gas; using an air-cooled corrosion probe, reduction of corrosion was observed to begin at an injection level of 0.3 wt % of fuel ooil fired. Injection of fly aah also showed some potential as a low-cost method of reducing corrosion. (Author summary modified)

21647

NIPPON KOKKAN KK-KOKO MODEL. BROCHURE DESCRIBING AMMONIA SCRUBBING PILOT PLANT. Translated from Japanese. Belov and Associates, Denver, Colo., 4p., April 22, 1970.

A pilot installation is described which simultaneously controls a very high percentage of emissions of dust particles and 90 to 95% of sulfurous acid gas. The apparatus embodies a wet-type, atmospheric vapor exchange method, in which liquid is poured through an anti-corrosive synthetic net and spreads out to form a film, through which the gases pass with a special contact mechanism. With very little pressure loss, nearly insoluble gases are effectively absorbed. Gas that has been inducted into the tower cannot leave without contacting the treated solution, and since it makes contact repeatedly, the gas absorption rate is greatly improved. Because pressure losses are small, the cost of running the gas conduction blower is reduced. Flexibility, ease of operation, and maintenance are improved, and recovery of valuable particulates from the gas stream is facilitated. Applications include use in boilers, high temperature furnaces, control of sulfurous gas from oil-burning fuel systems, odor counteraction, and gas recovery and heat exchange in the chemical and oil industries.

21886

Brocke, W.

SOOT SEPARATION AT OIL FIRED FURNACES. (Russabscheidung bei Oelfeuerungen). Text in German. VDI (Ver. Deut. Ingr.) Ber., no. 149:279-285, 1970. 19 refs.

Fuel oil consumption in the Federal Republic of Germany increased from 17.9 million tons in 1965 to 21.4 million tons in 1968, with the power plants alone accounting for about 25% of this amount. A heavy fuel oil-fired boiler emits between 0.23 to 8 kg dust/ton of oil. During normal operation the dust contains 90 to 95% of combustible matter, during soot blowing 75 to 93%. Dust concentrations between 15 and 400 mg/cu Nm could be measured in the waste gas during normal operation, and between 1000 and 10,000 mg/cu Nm during soot blowing. The gas contained 12% by weight sulfuric acid. Of the dust particles, 80% had diameters of less than 20 microns, with 20 to 30% having diameters less than 5 microns. Dust emission measurements taken at four oil-fired boilers (16 to 20 tons/h) revealed that centrifugal separators reduced the emissions from between 46 to 55 mg/cu Nm to between 24 and 40 mg/cu Nm during normal operation, and from 1050 to 1870 mg/cu Nm to between 104 and 174 mg/cu Nm during soot blowing. Better results can be achieved with electrostatic precipitators. but they are considerably more expensive.

21893

Lowicki, Norbert, Gernot Hanig, and Klaus Husmann

THE - WASTE GAS - SULFUR - PROCESS. REPORT ON THE DEVELOPMENT OF A PROCESS FOR THE REMOVAL OF SULFUR FROM FLUE GASES. Grillo-Werke A. G., Duisburg-Hamborn (West Germany), Oct. 1969. Translated from German. Belov and Associates, Denver, Colo., 68p., March 30, 1970.

The difficulty of the removal of sulfur from waste gases varies according to the origin of the waste gas. Waste gases of steam boiler plants precipitate rather uniformly with respect to quantity temperature, and composition. On the other hand, sinter waste gases contain additional metal oxide smoke which can complicate the process of sulfur removal. Thus, the process selected should have no sensitivity to disturbing gas components and should have versatility with respect to the absorption of any of the sulfur compounds coming under consideration. A desulfurization process was developed which is an absorption process with thermal regeneration of the charge absorbent. The process principle selected is based on the reaction of oxide compounds between a basic and an amphoteric heavy metal component. The presence of a compound Mg6MnO8 has been proven using X-ray structure investigation; the presence of a compound Mg3MnO5 is also probable. In this combustion, the basic component is used as the actual absorbent and the heavy metal component as the oxygen donor. This has the effect of increasing the total activity of the mixture. For the same reason, the absorption of hydrogen sulfide from waste gas is also made possible. In the thermal regeneration of the charge mass, both components protect each other reciprocally against deactivation. Economic aspects were a primary consideration in the selection of the desired components for the absorption mass. This eliminated elements like Cr, V, Mo, and Zn. Though Ca and Mg were practical, Fe and Mn were selected because of the rapid formation and stability of the oxide compounds between them as well as the inactivity during absorption. All chemical and process-technological predictions made on the basis of laboratory experiments were confirm. For oil-fired steam boiler plants, flue gas desulfurization plants ready for practical use can be set up and operated. Capital outlays and operational costs are given for an oil-fired 300 MW power plant, in addition to total annual operational costs. A particular advantage of this process is that the charge mass can be regenerated by various desulfurization systems at a central location.

22061

Akamatsu, K.

OZONE OXIDATION OF DIMETHYL SULFIDE AND DEODORIZING OF KP BLOW-GAS. (Jimechiru sarufaido no ozonsanka to KP burogasu no mushuka ni tsuite). Text in Japanese. Kami-pa Gikyoshi (J. Japan. Tech. Assoc. Pulp Paper Ind.), 22(4):200-204, April, 1968. 7 refs.

The main cause of obnoxious odor from kraft pulping (KP) is in the sulfur compounds that arise in the process. Sulfur compounds in reduced form are odoriferous whereas those in oxidized form are either odorless or just irritants. Tables are presented on the amount of dimethyl sulfide (DMS) that can be retrieved from KP black liquor at various temperatures and with different amounts of Na2S added. Different quantities of organosulfur compounds released in KP of different types of trees are listed for various pulping conditions. In general, the broad-leaved trees yield more odorant substances than do the coniferous trees. The data were obtained by a process similar to the theoretical method, and the quantity of organosulfur compounds from real KP process is probably much smaller. The gaseous sulfur loss balance sheet for two factories in the South (U. S.) show that most of the sulfur released is in the H2S emitted from the recovery furnace, followed by sulfur dioxide gas and DMS. A brief description of a process for deodorizing DMS by ozone oxidation is given. However, unless inexpensive methods are found for the production of ozone, the method is still far from application.

22074

Ishihara, Yoshimi, Chuhei Asakawa, and Hisashi Fukuzawa

REMOVAL OF SO2 IN COMBUSTION GAS BY INJECTING POWDERS OF LIMESTONE, CALCIUM HYDROXIDE, AND DOLOMITE. Electric Power Industry, Tokyo (Japan), Central Lab., 1p. 1 ref. Translated from Japanese. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 3p., Nov. 11, 1969.

As determined by laboratory experiments, sulfur dioxide evolved in a small combustion furnace is removed at an equal rate by limestone, calcium hydroxide, and dolomite powders. The reactivity of SO2 with limestone is improved by adding ochre to the powder or using a lime containing more than one percent iron. In the case of calcium hydroxide, a higher SO2 removal rate is obtained by injecting the compound in slurry rather than powdered form.

22291

Mitsubishi Heavy Industries, Ltd., Hiroshima (Japan), Hiroshima Experiment Station

GAS ABSORPTION CAPACITY OF VENTURI SCRUBBER. (Ventsuri skurraba ni yoro gusu kyushu). Mitsubishi Heavy Industry, Ltd., Tech. Rev., 3(3):1-7, 1966. 11 refs. Translated from Japanese. Belov and Associates, Denver, Colo., 26p., May 23, 1970.

The effect of a venturi scrubber on the gaseous effluent of a power plant is described. Special characteristics of the scrubber, and the nature of flow of the scrubbing liquid are discussed. The scrubbing liquid consists in part of limestone, manganese oxide, and water. Previous experiments on the capacity of the venturi scrubber as a gas absorbent are limited by small scale installations. The experiment described is conducted on a scaled-up version of a fuel-oil boiler. The effect of operating variables on each factor of gas absorbing capacity is analyzed. Graphic illustrations of changes in one parameter in terms of another one are included.

22400

Vedernikov, V. G. and V. F. Maksimov

SOME PROBLEMS IN THE DEODORIZATION OF GAS DISCHARGES IN THE SULFATE-CELLULOSE INDUSTRY. (Nekotorye voprosy dezodoratsii gazovykh vybrosov sul'fat-no-tsellyuloznogo proizvodstva). Tr. Tsellyul. Bum. Prom., vol. 13:148-154, 1964. 10 refs. Translated from Russian. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 13p., Nov. 11, 1969.

The use of uncondensed exhaust gases as a deodorizing agent in the sulfate-cellulose industry is discussed. Mercaptan and hydrogen sulfide trapping methods are described. A sulfane production system which employs condensation, scrubbing, absorption, and a methanol bath is considered. Experiments with black liquor oxidation are conducted in an attempt to solve deodorizing problems. The industrial method of obtaining dimethylsulfoxide from the toxic sulfur-containing discharge dimethylsulfide is discussed. Gases uncondensed by water discharged by the digestion works must be combined and directed into an absorption chamber. On evaporation of black alkalies, H2S and methyl mercaptan are isolated as a consequence of the hydrolysis of sodium sulfide and sodium mercaptide contained in the black alkali. Deodorization in the soda section with an electrofilter and a scrubber is feasible, but requires corrosion resistant conduit.

22497

Aliev, A. G.

URGENT QUESTIONS CONCERNING VERDANT PLANTINGS IN THE CITY OF BAKU. In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature. Effects and Symptoms of Air Pollutes on Vegetation; Resistance and Susceptibility of Different Plant Species in Various Habitats, In Relation to Plant Utilization for Shelter Belts and as Biological Indicators. M. Y. Nuttonson (ed.), vol. 2, Silver Spring, Md., American Institute of Crop Ecology 1969, p. 76-78. (Also: Akad. Nauk SSSR Ural Filial Komis. po Okhrane Prirody. Rastitel'nost i promyshlennye zagrazneniya. Okhrana Prirody na Urale. V (Sverdlovsk), 1966, p. 177-179.) As a result of many years of selection and utilization of drought- resistant woody and herbaceous plants, the city of Baku in the USSR has been transformed into one of the most verdant cities. Air pollution by noxious gases, smoke, and dust must be combated. In the spring and summer, the leaves and shoots of plants turn gray because of dust and soot. Ash particles accumulate in leaf stomata, interfering with the normal plant transpiration. The air under the trees is dusty and breathing is difficult. In these conditions, the usefulness of green plantings to man is greatly reduced. The flowers of shrubs and herbaceous plants must be washed off by sprinkling. This removes the soot and dust, moistens the air and soil, thereby providing favorable conditions for normal plant development, while enriching the air with water vapor and oxygen. Suggestions are given for improving the green plantings of hospitals and sanatariums in the Baku area.

22560

Aurielle, R.

THE ELECTRICAL DE-DUSTING EXPERIMENTAL INSTALLATION OF THE CHATOU TEST AND RESEARCH CENTER. (L'installation experimentale de depoussierage electrique du centre de recherches et d'essais de Chatou). Bull. Centre Rech. Essais, Chatou (France), no. 18:63-72, 1966. 10 refs. Translated from French. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 15p., Oct. 29, 1969.

A prototype electrostatic precipitator for thermal power-station smoke has two electric fields in a series, each constituting an electro-filter with collecting and emitting electrodes. The collecting electrodes are plates connected to the positive pole; the emitting electrodes are wires connected to the negative pole. The d-c potential difference between the plates and wires ionizes the air around the wires by corona effect. During their passage between the electrodes, dust particles are electrically charged by the ions or by molecular diffusion according to their size. The charged particles are attracted by the oppositely charged collecting surfaces on which they come to rest. The electrodes are hammered or vibrated to free them of deposited dust, which falls by gravity into receiving hoppers. The efficiency of the filter, defined as the ratio of the weight of captured dust to the weight of dust entering the device, depends on the electrode hammering and on the erosion of the deposited dust layer. To determine efficiency, soot deposits are weighed and, to find the mass of unretained soot, the concentration is measured at a point upstream of the electro-filter. Preliminary tests of the filters are in progress at a special experimental center.

22620

Podgorow, N. W.

PLANTINGS AS DUST FILTERS. (Die staubfilternde Rolle von Anpflanzungen). Les. Khoz., vol. 20:39-40, 1967. Translated from German. Belov and Associates, Denver, Colo., 7p., June 1, 1970.

The needles of pine trees and the leaves of birch and aspen trees were studied to determine their effectiveness as dust filters. Leaves of identical appearance retain dust differently depending on their specific location. Leaves from inside the crown were covered with more dust than the leaves from the periphery of the crown. The ability of pine needles to act as dust filters is also a function of their age. Three-year old needles located inside the crown detain more dust than needles from the outside after one year. The morphological structure of the leaves also influences their dust-retaining ability. The pores of pine needles form depressions resulting in an uneven surface which retains dust. Birch and aspen leaves, however, are sufficiently mobile so that the wind can remove the deposited dust. Plantings growing in the vicinity of the city of Leningrad retain 80.1% of the precipitation/surface of ground dust. From this quantity, up to 40.2% can be attributed to pine needles. The investigations thus showed that the pine is a good retainer of dust, and should be included in the plantings of parks and wooded areas near an industrial center.

22671

Pradel, Y.

IMPROVEMENTS IN THE DUST-REMOVING DEVICES OF THE PORCHEVILLE POWER STATION RESULTS OBTAINED. (Perfectionnements apportes aux depoussiereurs de la centrale de Porcheville resultats obtenus). Rev. Gen. Thermique (Paris), March 1963, 16p. Translated from French. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 34p., Nov. 3, 1969.

The Porcheville Power Station consists of four 125 MW units, each equipped with a combined mechanical and electrostatic dust-removing device. These units were placed in operation between March 1956 and April 1957. The original dust-removing devices proved to be insufficient, the efficiencies falling to less than 70% under maximum load conditions. A series of modifications were undertaken to improve the efficiency of the devices. These included increasing the time during which the gases remain in the electrostatic precipitator, changing the location of the mechanical collector, cleaning and adjusting the electrodes, improving the soot flow and air-tightness of the chambers, and modifying the electric supply. These changes resulted in a 20 point increase in efficiency; this corresponds to an approximate 5 to 1 reduction in the amount of dust discharged into the atmosphere. The present objective is to maintain the dust-removing devices in good operating condition by keeping the electrodes clean, accomplishing an optimum adjustment of the rectifier voltage, limiting the number of emitting electrode breakages, and obtaining a perfect adjustment of all mechanical parts of the devices. After the completion of the work in progress, efficiencies of 96% for maximum boiler load and 98% for normal production conditions will be possible. Of particular interest was the benefit obtained by relocating the multicyclones downstream from the electrostatic precipitators. Prior to the relocation the precipitators received only small particles which formed a tightly clinging coating on the electrodes which resisted cleaning agitation. When the relocation of the multicyclones permitted the precipitator to receive larger particles, these interrupted the surface of the coating on the electrodes sufficiently to greatly improve cleaning efficiencies.

22957

Sano, Hiroshi and Yoshie Nakamoto

ABSORPTION OF SO2 GAS. (Aryusan gasu no kyusyu). Osaka Engineering Station (Japan), 1p., 1969 (?). Translated from Japanese. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 2p., Oct. 1969.

Various sulfur dioxide-absorbing solvents were examined in terms of water solubility and oxidation losses. The types of solvents tested were DMSO, DMF, dioxan, cellosolve, piridine, phenol-ether, and hydrocarbons. Good SO2-absorbent solvents do not mix well with water and are either neutral or acidic. Phenol-ether such as anisol are good absorbents.

22961

Novotny, Pavel

FLUID-BED COMBUSTION OF SOLID AND LIQUID FUELS AND WASTES. (Fluidni spalovani tuhych a kapalnych paliv a odpadu). Inst. Fuel Research, no. 14, 59p., 1969. 42 refs. Translated from Czech. Belov and Associates, Denver, Colo., 57p., Jan. 30, 1970.

Fluid-bed combustion generally describes the oxidation reaction that takes place in the fluid layer. The fuels used can be solid, liquid, gaseous, or any combination of these. Some basic observations concerning fluid-bed technology are made. The basic types of fluid-beds are described. The theory of operation of the fluid-bed involves turbulent fluid flow and mass exchange. Mathematical relationships of fluid-bed phenomenon are determined. Fluid-bed combustion has the potential ability to effectively bind oxides of sulfur to alkaline additives by a drying method. It can also utilize a greater size range of coal fuel, and it reduces the ash content in the effluent. Designs of various fluid-bed reactors are given. Research into the combustion properties of various fuels is discussed.

23002

Morikawa, Takaaki and Isao Fujita

CLOSED SYSTEM ODOR REMOVAL PLANT FOR ANIMAL FIBERS, RUBBISH AND FATS. (Senkuzu, niber, jushi nado no mippeihoshiki ni yoru kanzc dasshu no puranto). Text in Japanese. Akushu no Kenkyu (Odor Research J. Japan), 1(1):61-65, April 20, 1970.

Manufacturers of cooking oil and livestock feed have been the biggest producers of odor in the community. A disposal plant was established to improve the waste quality and to solve the odor problem at the the same time. Raw animal fat of high quality and with 75% oil content is attractive from the standpoint of oil and fat processing. Other animal rubbish and fibers consist of as much as 50% water and gelatine and are rather hard to be utilized for oil and fat processing and also for livestock feed. The main efforts were directed to eliminate the drawbacks of the conventiona type of open kilns. The local overheating of the kiln due to the oilburner it uses scorches the materials and results in poor-qualit oil and fat byproducts. The merit of the currently devised plant can be characterized as its closed system. The kiln designed to collect odor bearing vapor and to send it to a pressure reducer where the emission gas is mixed with water for dilution effect. Th material can be treated to a better quality under reduced pressure along with less temperature variation according to the kind of raw materials being processed. Odor contained in the vapor can be reduced. The flowchart of this closed system plant and related data are presented.

23079

Sorokin, Yu. L., L. N. Demidova, and U. P. Kuz'min

PRINCIPLES OF DROP SEPARATION FROM VAPOR OR GAS STREAMS. (O nekotorykh zakonomernostyakh separatsii kapel' iz potoka para ili gaza). Text in Russian. Khim. i Neft. Mashinostr., no. 8:20-22, Aug. 1968. 19 refs.

Some separator designs for removing liquid drops from vapor or gas streams are compound, and the most promising of these as measured b allowable velocities and residual vapor moisture is determined. Separation devices are, in effect, packings which are inserted into the top section of apparatus in the form of a horizontal layer 80 to 200 m high. Systems tested include air-water, air-kerosene, air-water-sodium oxide solution, and steam-water. Vertical and inclined baffle separators can be considered to be the most promising and can be recommended for wide application since they operate at very high inlet velocities and provide the same or somewhat lower residual moisture as horizontal baffle separators, Raschig ring packings, and standard meshes. (Author abstract modified)

23136

Vorobev, D. D., A. P. Sergeev, V. G. Balanov, R. I. Davidzon, V. L. Vodolazhchenko, V. P. Mikhno, and L. N. Tyutyunnik

DUST ARRESTOR PERFORMANCE AND DUST HANDLING IN COKE DRY-COOLING PLANT. Coke Chem. (USSR) (English translation from Russian of: Koks i Khim.), no. 1:20-21, 1970.

At a coke dry-cooling plant in the Soviet Union, dust is removed from circulating gas to a dust-settling hopper before the gas stream enters the waste heat boiler and again in cyclones before it enters the exhaust fan. By fitting the hopper with high-strength chamotte baffles, the average dust content of the gas entering the cyclones was reduced to 3-4 g/cu m compared to 4-6 g/cu m when the baffles were supported by welded steel girders faced with guniting material. Erosion of the cyclones was checked by lining internal surfaces of all conical sections with cast stone slabs. Coke breeze and dust from the hoppers and cyclones is discharged through a sludge pipeline to a settling tank on a quenching tower. Blockage of the pipe was reduced by increasing its angle of inclination and the addition of more wash down nozzles along its length.

23249

Chertkov, B. A.

CONVERSION OF AMMONIUM SULFITE-BISULFITE SOLUTIONS TO AMMONIUM SULFATE AND ELEMENTARY SULFUR. (Pererabotka rastvorov sul'fit- bisul'fita ammoniya na sul'fat ammoniya i elementarnuyu seru). Koks i Khim., no. 1:48-53, 1956. 9 refs. Translated from Russian. Israel Program for Scientific Translations, Jerusalem, 9p. CFSTI: TT69-55059

There is wide interest in utilizing ammonium sulfite-bisulfite solutions to produce ammonium sulfate fertilizer since the solution can be converted to sulfate without expenditure of sulfuric acid. Furthermore, sulfur-containing waste gases provide an unlimited source of ammonium sulfite-bisulfite. In the 'catasulf process,' hydrogen sulfide from coke oven gas is catalytically oxidized to sulfur dioxide, which is then absorbed together with ammonia to form the sulfite-bisulfite mixture. The latter is processed in an autoclave at high temperature to ammonium sulfate and elementary sulfur. Disadvantages of the process are that the decomposition of the sulfite-bisulfite mixture in the autoclave has to be performed at high pressure and that the autoclave must be made of heat resistant materials. As determined by a kinetic study of the process, decomposition of the ammonium sulfite-bisulfite solutions to ammonium sulfate and elemental sulfur can be performed within a technically acceptable time (1.5 hr) in an open apparatus under normal pressure. For this purpose, the solution must be vigorously mixed in the first stage of the process with a large excess of sulfur, and at the same time heated to 100-105 deg to accelerate the formation of intermediate ammonium thiosulfate. After the required thiosulfate concentration is reached, the solution must be acidified (with H_2SO_4 or SO_2) to convert the residual sulfite to bisulfite and to accomplish complete decomposition of the solution. Pilot-plant tests of the technique could result in the early application of more efficient methods of purifying sulfur-containing gases, including techniques for the simultaneous utilization of NH_3 and H_2S from coke oven gas.

23251

SOVIET SCIENTISTS DISCUSS AIR POLLUTION. NTO-SSSR, no. 12: 16-18, 1968. In: Commentary in Soviet Periodicals on Environmental Pollution. Translated from Russian. Joint Publications Research Service, Washington, D.C., p. 30-36, April 1970. CFSTI: PB 190788

A discussion of air pollution in the Soviet Union is presented. Automobile emissions are not as serious a problem in Russia as they are in the United States, particularly California. Stack gases are being filtered to remove the particulates. Sulfur dioxide can be removed by desulfurization of fuel, by utilizing high chimneys, by replacing sulfur-containing fuel with natural gas, and by reacting the sulfur with other chemicals to capture it. Two methods of capturing the sulfur are the cyclical magnesite and the ammonium autoclave methods. A description of these methods is given, including their shortcomings. Filtering petroleum at the refinery and treating the resulting hydrogen sulfide by the Klaus method would be an expedient way to handle the problem. Catalytic oxidation methods for treating hydrogen sulfide are described. Hydrocarbons are generally controlled by either absorption or adsorption. Filtering of waste gases and ventilation of large quantities of air are expensive processes. If they can be avoided by improving other operations, considerable economic savings will be realized.

23262

Ito, Akio, Tadao Shirasawa, Tomio Ohyanagi, and Yukio Tamori

PACKED COAL BED AS A DUST COLLECTOR (II). Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 2(1):98-100, 1967. Translated from Japanese. 8p.

Dust collection using packed coal was studied for treatment of the exhaust of coal-fired furnaces and incinerators. The coal from which smoke was collected was fed into a combustion chamber, so that no dust trapping device was needed and operation could be achieved with only a single collector. Generally, in the case of filtration, collection efficiency is improved due to the deposition of smoke on the filter. However, the flow rate of gases is reduced due to thickening of the smoke layer, provided that the power of the suction or blower is maintained constant. Consequently, it is uncertain whether the rise of collection efficiency was due to formation of the dust layer or to the reduction of flow rate. In this experiment, the equipment was improved so that both effects could be separately evaluated. An experimental equation of pressure loss and collection efficiency was derived for a nearly uniform size of coal layer which was produced by sieving. An experiment was also conducted on packed beds of spherical active carbon and glass spheres in order to elucidate the feature of the coal bed in comparison with the above two standard beds. In this type of collector, the amount of coal employed for dust collection and that consumed for the combustion was balanced; this requirement imposed restrictions on the thickness of packed bed, flow rate of exhaust gas, area of beds, and interval for replacement of coal. For a given coal consumption, the gas flow rate was roughly determined, and the area of the bed was derived from the optimum face velocity. Beds of 7 and 14 cm thickness were tested. On determining the optimum thickness of the beds, the interval of time for the replacement of coal was derived. This procedure provided the standard for practical design of a coal bed. The smoke-laden gas of fixed volume was drawn through circular filters up- and downstream of the smoke collector, and the amount of smoke was determined by measurement of light reflectivity of the filter surface on which the smoke was deposited.

23263

Okita, Toshiichi and Masahiko Enomoto

REMOVAL OF SO2 BY FILTER IMPREGNATED WITH ALKALI. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 2(1):98-100, 1967. Translated from Japanese. 8p.

The superiority of filters impregnated with chemicals for collecting and analyzing atmospheric trace gases has led to experimentation of the above principle in the removal of gases. The removal of sulfur dioxide from air was tested using Philedon and Bonden filters impregnated with alkali. P15/500 Philedon and No. 291 Bonden filters were soaked in 20% aqueous solutions of alkalis such as NaOH, KOH, and Na_2CO_3, with 10% of glycerine added, and dried at 80 C. The filter was fitted to a wind tunnel and its collection efficiency was measured for an SO_2 concentration on the order of 10 ppm. The face velocity through the filter ranged from 46 to 96 cm/sec; pressure drop across the filter was 1 mm of H_2O. Collection efficiency by the Bonden filter was 60 - 70%. Efficiency by the Philedon filter was initially almost 100% but the efficiency gradually dropped with prolonged operation of the filter. The rate of reduction of efficiency was largest with the filter impregnated with Na_2CO_3. With the filters impregnated with NaOH and KOH, nearly equal reductions of efficiency were observed. Although the experimental values were scattered for individual filters, the collection efficiency was still 80% even after 10 ml of SO_2 was collected on 1 sq cm of the filter, which corresponded to the collection of 0.1 ppm of SO_2 for about 500 hours with a face velocity of 50 cm/sec. No variation of efficiency with humidity was observed for the experimental range of 60 to 82%.

23264

Adachi, Noriyoshi, Makoto Kimura, and Seiko Hashimoto

ELECTRIC FILTRATION OF SO2. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 2(1):98-100, 1967. Translated from Japanese. 8p.

To develop equipment for the removal of sulfur dioxide in flue gas, a wet-type electric precipitator was constructed and a basic study of electric filtration of SO_2 was performed. Liquid was dropped along the inside wall of a glass cylinder of 35 mm inner diameter. The corona electrode was placed at the center of the cylinder and voltage was applied between the corona electrode and the liquid surface. A known concentration of SO_2 gas was introduced from the bottom of the cylinder, passed through the corona discharge, and was taken out from the top of the cylinder. Sampling of SO_2 was in accordance with Japan Industrial Standard JIS-KO103-1963; titration was employed for the analysis of SO_2. As SO_2 is an electronegative gas on which electrons are easily attached, its collection efficiency was increased at a corona starting voltage of 5 kV and the efficiency was constant with voltages larger than a certain value. The collection efficiency was always higher with a negative corona electrode voltage than with a positive one. With positive voltage above a certain level, collection was not achieved steadily. A flow rate of about 100 ml/min. was most adequate. Gas collection efficiency was greater than 95% with an applied voltage of 9 kV and SO2 concentration below 0.45%. In the preceding results, water was employed as the collection medium. Further experiments were conducted using a 5% aqueous solution of Na2CO3 and a 10% aqueous solution of sulfuric acid. The collection efficiency was reduced with the increase of SO2 concentration; this tendency was more pronounced with the sulfuric acid solution. With a voltage of 7 kV, the efficiency with the Na2CO3 solution was almost 100%, whereas with the sulfuric acid solution it was only 35%.

23303

Kiyoura, Raisaku, Haruo Kuranuma, and Yoshisuke Uenishi

RECOVERY OF AMMONIUM SULPHATE FROM SULPHUR DIOXIDE IN HOT FLUE GASES. (X). EFFECT OF DUST ON THE CATALYST ACTIVITY. (Ryuan nado o fukusei suru Endohaigasu no jyogaiho. (X). Syokubaiso ni hirai suru dasuto no syokubai kassei ni ataeru eikyo ni tsuite). Tokyo Inst. of Tech. (Japan), p. 1425, 1969 (?). Translated from Japanese. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 2p., Oct. 28, 1969.

In a desulfurization system designed to recover ammonium sulfate, the possibility of dust passing through the collector system and poisoning the catalyst was investigated. An amount of dust equal to 3, 6, and 12% of the total weight of the catalyst (roughly the amount thought to have collected in a period of 3 to 12 months) was sprinkled on the catalyst and flue gas was passed over the catalyst at a stack velocity of 3000 and 6000 l/min at a temperature of 350- 450 C. No significant affect on the catalyst was observed.

23307

Kiyoura, Raisaku, Hiroshi Kubota, Haruo Kuronuma, Yoshisuke Uenishi, and Masayoshi Ueki

RECOVERY OF AMMONIUM SULPHATE FROM SULPHUR DIOXIDE IN HOT FLUE GASES (VIII). KINETIC EQUATION FOR THE OXIDATION OF DILUTE SO2 GAS. (Ryuan nado o fukudei suru Endohaigasu no jyogaiho (VIII). Kihadu SO2 gasu sanka no hanno sokudoshiki ni tsuite). Tokyo Inst. of Tech. (Japan), p. 396, 1968 (?). Translated from Japanese. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 2p., Oct 27, 1969.

Oxidation of mixtures of sulfur dioxide (0.1 to approximately 0.4%) and oxygen (1 to approximately 4%) was studied with a V205-K2S04 catalyst, and a kinetic expression was determined for the oxidation. The experimental values are in good agreement with the values calculated form the expression, which assumes that the rate-determining step is the surface reaction 2S02 yields SO2 + SO and that SO2 is adsorbed on the surface.

23368

Yamamoto, Kyoko and Michiharu Seki

ADSORPTION OF SO2 BY CARBON ADSORBENT (II). CATALYTIC OXIDATION OF SO2 ON THE SURFACE OF ACTIVATED CHARCOAL. (Tansokei kyuchakuz no SO2 kyuchaku (dia 2-ho). Kasseitan hyomen ni okeru SO2 no sessyoku sanka hanno). Hitachi Manufacturing Co. (Japan), Central Inst., p. 1419, 1968 (?). Translated from Japanese. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 2p., Oct. 27, 1969.

Measurements of the state of adsorption of sulfur dioxide on activated charcoal demonstrated the partial existence of physical adsorption when SO2 was adsorbed at 100 C with water and oxygen. Most of the adsorbed SO2 was extracted (above 180 C) as SO4(-2) with water, the remainder with H202. Since the same results were obtained with charcoal samples that adsorbed H2S04 directly, SO2 appears to exist as SO3 or H2S04 on the surface of charcoal. Sulfur dioxide with 02 and H20 had a greater tendency to be adsorbed as H2S04 than did SO2 with 02 alone or H20 alone, and the speed of the reaction was faster. The implication of this finding for adsorption of SO2 in exhaust gas is noted.

23575

Sieth, J.

REPORT ABOUT MEASUREMENTS OF WASTE GAS AT THE GRILLO DE- SULFURIZATION INSTALLATION AT UNION RHEINISCHE BRAUNKOHLEN- KRAFTSTOFF AG. FIRM IN WESSELING. Bericht uber Abggasmessungen an der Grillo-Entschwefelungsanlage bei der Firma Union Rheinische Braunkohlen-Kraftstoff AG. in Wesseling). Landesanstalt fuer Imissions-und Bodennutzunsschutz des Landes Nordhein-Westfalen, 46p., 1970. Translated from German. Belov and Associates, Denver, Colo., 31p., Sept. 9, 1970.

Research involving a stack gas cleaning operation for particulates, fluorine, and desulfurization is described. Sulfur trioxide and sulfur dioxide quantitites remaining in the treated gas are measured. Treatment consists of dry alkaline additives, followed by cyclones and scrubbers. Stack samples are taken at four points; the methods and equipment are described. According to fluorine measurements, the optimum fluorine reduction is achieved in the desulfurization installation. No amounts of sulfur trioxide are detectable in the treated gas when the proper amount of desulfurizer is used.

23690

Atsukawa, Masumi, Korechiko Nishimoto, and Kazhurio Matsumoto

REMOVAL OF SO2 FROM WASTE GASES. Mitsubishi Juko, 2(2):83-92, 1965. Translated from Japanese. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 43p., Nov. 12, 1969.

Economic and engineering problems to be resolved before application of wet methods of removing SO2 from waste gases are reviewed. Selection of a removal process is shown to be influenced by the limit of absorption, the velocity of the reaction, and the price of the absorbent. For instance, it is difficult to use organic solvents or basic aluminate sulfate on gases containing less than one percent SO2. The price of the absorbent comes into question because of the large losses when the SO2 content of a gas is low. Organic solvents and ammonia, for example, are easily lost because of their high vapor pressures. Another factor to be considered is the demand for and prices of compounds recovered from SO2 gases. Consumption in 1963 of recovered ammonium sulfate, sulfur, sulfuric acid, gypsum, sodium sulfate, and sodium sulfite are summarized in tabular form, as are the amounts of SO2 emitted by power plants, sulfuric acid plants, and nonferrous metal refineries. Variations in Japanese consumption of the by-products are illustrated graphically. The characteristics and pilot-plant data of four wet absorption methods are also presented. The methods are an ammonium process applicable to high-temperature gases from sulfuric acid manufacture, a manganese oxyhydroxide process with recovery of ammonium sulfate, limestone processes with or without recovery of gypsum, and a red mud method. In the latter the mud discharged when alumina is extracted from bauxite is the absorbent. It is feared that the methods are not applicable to power plants because of the following obstacles: generation of white smoke, decrease in the diffusability of the smoke, and corrosion inside chimneys. It is hoped these disadvantages can be overcome by a dry method now under testing. In this method, a solid absorbent is contacted with a gas at 100-140 C and the absorbent regenerated.

23873

Tanaka, Kusuyata, Tsuyoshio Yamada, Atsumi Sakabe, So Kawaii, Kunio Miyajima, and Shinzo Hirasawa

ABSORPTION OF SULFUR COMPOUND IN EXHAUST GAS BY LIMESTONE. (Source Not Given). p. 397, 1969 (?). Translated from Japanese. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 3p., Nov. 18, 1969.

Experiments were conducted in an electric furnace to determine optimum temperatures for the absorption of sulfur dioxide by calcinated limestone. The absorption rate was highest when the limestone was calcinated at 1100 C and sulfur dioxide absorbed at 900 C. At the latter temperature, the amount of SO2 absorbed per 100g absorbent is 24.68g.

23983

Kamino, Yasumi, Masaaki Miyaji, Shigenori Onituka, Kenji Yasuda, and Yoshide Kawamura

STEAM DESORPTION APPLIED TO ACTIVE CARBON PROCESS FOR THE RECOVERY OF SULFUR DIOXIDE FROM FLUE GASES. Hitachi Zosen Giho, Hitachi Zosen, Tech. Rev., 29(3), Aug. 1968. 6 refs. Translated from Japanese. Belov and Associates, Denver, Colo., 23p., Sept. 18, 197

Present methods of dry desulfurization using activated carbon are expensive because of the loss caused by the oxidation of the absorbing agent, and they are dangerous because of the possibility of an explosion. Experiments involving a variation of the dry method are described. Using high grade activated carbon instead of semi-coke not only increases the absorption potential, but also requires much less equipment. The use of super-heated steam as a desorbing agent lengthens the life of the carbon and also prevents the possibility of an explosion. The method economically removes sulfur dioxide gas at high concentrations. Bench-scale plants using this method have been successfully operated, but further research is necessary before full-scale operations can begin. A flow chart of the test plant adopting all of the described characteristics is given.

24239

Shidara, Masao

MEASURES TAKEN BY IRON AND STEEL INDUSTRY TO PREVENT AIR POLLUTION AND SO FORTH. (Tekko gyokai no sangyo kogai boshi taisaku). Tex in Japanese. Sangyo Kogai (Ind. Public Nuisance), 6(10):578-586, Oct. 25, 1970.

The Iron and Steel Industry Association has established the Industrial Hazards Countermeasure Committee, which has four special subcommittees: Air Pollution Prevention, Factory Effluent, Industrial Wastes, and Factory Safety (which handles high pressure gas, and so forth.) A joint study is being made by more than 10 manufacturers of desulfurization equipment on the desulfurization of smoke issuing from pulverized iron ore process stacks. Joint research by iron and steel makers is being conducted using desulfurizing equipment with a capacity of 150,000 cu ft/hr, with a 3 million dollar research fund. Measures taken by another steel mill include establishment of a pollution prevention committee, watching of smoke, dust collection review circle, liaison council with related organizations, and smoke control staffs. Various equipment used by the iron and steel industry for blast furnace, sintering furnace, LD converter, open hearth, and electric furnace control, such as bag filters, coolers, cyclones, centering chambers, dust chambers, electric dust collectors, multi-cyclones venturi scrubbers, stabilizers, washers, wet filters, and scrubbers are described. Chemical compositions of dust collected from these furnaces are tabulated. Measures for the prevention of sulfurous acid gas taken by the newly operating KM Steel Mill are described, followed by those taken by the newest KKK Steel Mill (first firing in August, 1970). They include not only prevention of air pollution, but also prevention of noise, prevention of pollution of sea water, and construction of a green belt. Investment on anti- air-pollution spent by SY Steel Mill up to 1968 was $33 million, with a monthly operating cost of $133,000. The rate of investment on prevention of industrial hazards, invested by 137 mills in iron and steel industry (as of Oct. 1969, MITI), increased from 3.22% in 1965 to 4.44% in 1969.

24609

Fried-Krupp, Essen (West Germany), Zentralinstitut fuer Forschung und Entwicklung

METHOD FOR THE SEPARATION OF PYRITE FROM COAL. (Verfahren zur abscheidung von Pyrit aus Kohle). Rept. 41/69, 19p., 1969. 7 refs Translated from German. Belov and Associates, Denver, Colo., 23p., Feb. 23, 1970.

Investigations of untreated coal which were conducted in different countries indicate that the pyrite percentage of the total sulfur content of coal is so high that mechanical separation could result in a significant reduction of the sulfur content. Separation is technically possible and economically feasible as pyrite occurs at an average of 80-90% in a particle size larger than 20 micron. Wet methods (gravity and centrifugal separation, gravity turbidity methods, and flotation) should have preference because of their operational and throughput efficiency. In connection with the trend towards the hydromechanical production of coal, direct burning of mud in power stations is discussed. The use of atomic heat is being contemplated to reduce the cost of drying. The selection of installations for sulfur removal is discussed according to the particle size region of interest. If the sulfur content of the initial coal can be reduced by at least 30-40%, and if the operational costs of the sulfur removal amounts to approximately 5 to 35 cents per ton product, then it is profitable to provide mechanical pyrite separation methods. (Author conslusions modified)

24730

Bernatzky, A.

THE IMPORTANCE OF PROTECTIVE PLANTINGS AGAINST AIR POLLUTANTS. (Die Bedeutung von Schutzpflanzungen gegen Luftverunreinigungen). Air Pollution. Proc. First European Congr. Influence Air Pollution Plants Animals, Wageningen, Netherlands, 1968, p. 383-395. Translated from German. Belov and Associates, Denver, Colo., 16p., Sept. 9, 1970.

As indicated by a review of the literature, forest belts do not solve the problem of air pollution but, when properly planned, will facilitate the reduction of air pollutants. Though generally ineffective in the case of sulfur dioxide, pollution-resistant species reduce atmospheric concentrations of dust and of solid and gaseous radioactive substances. In addition, they reduce noise, prevent binding of SO2, and increase the relative humidity of air. Solid particles can be filtered from the atmosphere by planting open stands of trees or shrubs. Dense stands are needed for gaseous pollutants. In protective plantings, the longitudinal axes have to run across the prevailing wind direction. In areas without wind, e.g., towns, hot air ascends and relatively cold air pours in from all sides, leading to the accumulation of polluted air in the center that has to be filtered by concentric plantings. The closer the forest strips to the source of smoke, the greater their effectiveness. (Author summary modified)

24735

Sano, Hiroshi, Yoshimune Yo, and Yoshie Nakamoto

ABSORPTION OF SO2 GAS BY VARIOUS SOLVENTS. (Aryusangasu no yobaikyushu). Osaka Engineering Labs. (Japan), p. 658, 1969 (?). Translated from Japanese. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 2p., Oct. 21, 1969.

For the purpose of recovering dilute sulfur dioxide gas, the solubility of SO2 to various organic or mixed solvents was studied. Sulfur dioxide gas was led through 50 ml of solvent at 1 atm and 30 C. When the solvent was saturated with the absorbed gas, it was diluted by 10 liters of alkaline water. Dissolved SO2 from a certain quantity of solution was measured by iodine titration. Among pure solvents, the SO2 solubility increased in the following order: saturated hydrocarbon, water, aromatic hydrocarbon, alcohol ester, ether, ring ether, formamide, DMF, and DMSO. In the case of mixed solvents, on the other hand, the solubility can be classified into a convex solubility curve, linear solubility curve, and concav solubility curve. When two polar solvents of non-hydrogen bond are mixed with each other, the solubility shifts toward that of higher solubility. As a result, the solubility curve becomes convex, and sometimes a maximum value shows up. The solubility becomes linear when two solvents with little interaction are mixed together. When a good solvent is mixed with a poor solvent with a hydrogen bond, such as water, the dissolving power is drastically reduced and the solubility shifts towards that of the poor solvent.

24813

Yanagihara, Shigeru

EMISSION AND PERFORMANCE OF GASOLINE ENGINE. (Gasorin kikan no seino to haiki joka gijutsu). Text in Japanese. Nenryo Kyokaishi (J. Fuel Soc. Japan, Tokyo), 49(521):646-655, Sept. 20, 1970. 14 refs.

Most automobile emissions are products of a high temperature and high pressure combustion chamber. The formation of carbon monoxide and nitric oxide are explained by equilibrium in the combustion reaction; the quench zone in the combustion chamber yiel unburned hydrocarbons. Carbon monoxide and hydrocarbons can be oxidized in the expansion stroke or exhaust systems. Reduction of nitric oxide and particulate emission is a serious problem for exhaust control techniques. Although an exhaust thermal reactor and catalytic converter have been developed, non-leaded fuel is necessary for their effective operation. A low emission vehicle should appear by 1975, but the power plant of the family car still may be the gasoline engine. In the near future, fuel will be subject to more severe restrictions to reduce the pollutants in exhaust gas; as an immediate target, at the risk of reducing some of gasoline's performance, it would be made in such a way that emission of pollutants would be about 10% of the former level. In 5 or 10 years, automobiles should hardly be a problem as sources of environmental pollution.

25033

Rueb, Friedmund

AIR POLLUTION CONTROL IN INDUSTRIAL PAINT-SPRAYING PLANTS. (Luftreinhaltung in industriellen Lackierbetrieben). Text in German. Wasser Luft Betrieb, 14(9):347-353, Sept. 1970.

The construction and operation of paint spray booths and cabins with dry separators, of water-rinsed booths, of enclosed spraying and drying booths, the drawing off and reclamation of organic solvents, thermal combustion of polluted air, and its catalytic combustion are described. In dry separation, paint mists are drawn off by ventilators through labyrinth filters; wet separation where the walls of the spray booths are constantly being rinsed with water or where the mist has to pass through a screen of water produces exhaust air of higher purity and minimizes the danger of fires. Enclosed spray booths use principally for spray painting automobiles are so constructed that the operator is supplied fresh air. Paint and solvent separation is the same as in open booths. The recovery of solvents is accomplished by absorption with activated carbon whence the solvent is expelled by steam. When the emission of solvents into the atmosphere exceeds 10 kg/hr, then the German law stipulates the mandatory use of a thermal or catalytic combustion installation. The presence in the atmosphere of catalytic poisons like lead or phosphoric acid esters makes catalytic combustion inapplicable. Combustion takes place at 650-800 C. The advantage of catalytic combustion is that it operates with higher concentrations and lower temperatures.

25306

Koncar-Djurdjevic, Slobodan K., Dejan M. Bajic, and Bojan D. Djordjevic

OPTIMAL CONDITIONS OF SEPARATION OF MATERIALS CAUSED BY ELECTRIGATION PARTICLES DURING THE FLUIDIZATION. Doc. Chem. Yugoslavica, vol. 28:501-512, 1963. 3 refs. Translated from Yugoslavian. Belov and Associates, Denver, Colo., 10p., June 15, 1970.

The factors which influence the separation of materials as a consequence of electrocharging particles during fluidizing processes are investigated. The optimum yield and purity of separated products can only be attained when all influencing factor are correctly determined. Besides the general factors of humidity, temperature, and shape and material of the fluidizing column, the significance of electrode shape, height of the submerged electrode, relative ratio of components, weight of the mixture, air flow, particle size distribution, and fluidization time is analyzed. Experiments are carried out on two-component systems involving calcium carbonate, silicon dioxide, potassium nitrate, sodium chloride, and barium sulfate. The results of the system involving CaC03 and Si02 are given, since it is representative of the others. CaC03 with a purity of 96-98% is separated on the electrode. By varying the influencing factors, the optimum conditions for each can be established.

25427

Scaiola, Gianni

ESTIMATION OF THE INVESTMENTS AND EXPENDITURES NECESSARY FOR THE ELIMINATION OF POLLUTION. (Stima degli investimenti e dei costi necessari per l'eliminazione dell'inquinamento). Text in Italian. In: L'Inter-

vento Pubblico Contro l'Inquinamento: Rapporto di Sintesi, p. 107-136, June 1970. 9 refs.

The investment, maintenance, and operating costs involved in the elimination of the more important forms of air and water pollution are estimated with reference to automotive emissions (hydrocarbons, carbon monoxide, and nitrogen oxides), industrial emissions (particulate pollution, sulfur dioxide, nitrogen oxides, hydrocarbons, and fluorine compounds), electric power plants, domestic heating (with a table of central heating plants and corresponding population figures for eleven Italian cities), liquid effluents from industrial and private sources, and the marine transport of petroleum and petroleum products. For each category, the procedure is described by which the estimates are made.

26003

Harada, G., S. Yamamoto, K. Osumi, H. Shimizu, and H. Omi

TREATMENT OF DUST GENERATED AT IRON MILL. (Seitetsusho ni hasseisuru dasuto shoriho). Text in Japanese. (Japan Magnetic Ore Screening Co.) Japan. Pat. Sho 43-29863. 3p., Dec. 21, 1968. (Appl. Feb. 1965, claims not given).

A method is described for recovering oxidized iron by adding cement or plated lime to the fine wet iron dust particulates from the sedimentation tank, thus making it easier to handle. Even afte the dust from the sedimentation tank is dehydrated with a filter, it still contains 30% water which prohibits its reuse. However, the dust mixed with cement or lime dries and solidifies naturally, permitting reuse for sintering. Because of the capillary action of the small air spaces between the dust particles as well as the water adhering to their surface, mechanical methods are ineffective Evaporation by heat is too expensive. Dust from sticky ores and from the stacks of the sintering mill can also be treated by this method, thus conserving useful resources.

26084

Juntgen, H. and K. H. van Heek

COURSES OF REACTION UNDER NON-ISOTHERMIC CONDITIONS. (Reaktionsablaufe unter nicht-isothermen Bedingungen). Preprint, Bergbau-Forschung G.m.b.H., Essen-Kray (West Germany), Steinkohlenbergbauverein, p. 601-699, 1970. 195 refs. Translated from German. Belov and Associates, Denver, Colo., 127p., March 16, 1970.

A review of the literature and preliminary experimental results are presented for the kinetics of chemical reactions and physical processes under conditions of chronological and spatial changes in temperature. Based on fundamental equations which describe the course of such reactions, the methods used to determine the order of reaction, the activation energy, and the frequency factor are discussed, and experimental methods in current use for determination of kinetic parameters are evaluated. Various investigations and results on the release of water from salts and hydroxides, the calcination of carbonates and oxalates, reactions of metallic oxides and carbonates with sulfur dioxide, and reactions on carbon surfaces are surveyed, and the application of the non-isothermal method to the thermal decomposition of carboxylic acids and polymeric plastics as well as to the pyrolysis of natural substances (particularly bituminous coal) is explained. Chemical reactions in a liquid phase, the desorption of gases from solids, annealing processes disturbed crystal lattices, and the emission of exoelectrons from metallic surfaces are also discussed. (Author abstract modified)

26138

Kosmider, Stanislaw and K. Ludyga

DISTURBANCE OF ACID-BASE AND ENZYME EQUILIBRIUM IN EXPERIMENTAL INTOXICATION WITH SO2 AND PROTECTIVE ACTION OF AMMONIA. (Enzymatische und Saeure-Basen-Gleichgewichtsstoerungen nach experimenteller SO2-Vergiftung sowie Schutzwirkung von Ammoniakdaempfen). Text in German. Int. Arch. Arbeitsmed., 26(4): 316-334, 1970. 14 refs.

In connection with a new method for neutralizing sulfur dioxide in combustion gases by means of ammonia, the changes induced by SO2 in guinea pigs were examined and compared with the effect of the products of the reaction of SO2 with ammonia. The first group of twenty guinea pigs were exposed to SO2 at a concentration of 2 g/cu Nm in a special toxicological chamber; the second group of twenty were similarly exposed to the products resulting from the reaction of SO2 with ammonia. The third group of twenty animals were exposed to SO2 at a concentration of 50 mg/ cu Nm for eight hours a day for four months, and the fourth group of twenty to the reaction products of SO2 plus NH3 for a period of four months. The blood of all the animals was examined for the level of hemoglobin number of erythrocytes and leukocytes, the colored indicator, and a percentage composition of leukocytes. Disturbances of acid-base equilibrium were investigated, as well as the pH of blood taken fro left ventricle, the partial pressure of carbon dioxide and the tota pressure of CO2 in the plasma. Also determined was the total protein level as the activity of aldolase, lactic acid dehydrogenas and asparagine and alanine aminotransferase. Urine contents of sugar, protein and morphotic components were determined for pH. Samples of liver and brain were taken after the animals had been sacrificed, and the activity of their enzymes was determined as wel as those of the blood. The toxic activity of SO2 is multiple and leads to the impairment of the function of several organs. Toxic action of SO2 is due to the disturbances of the acid-base equilibrium brought about by the inhalation of acid products and by the disturbances of ventilation resulting from changes in the respiratory system. The decreased activity of aldolase and lactic- acid dehydrogenase in the blood and tissues in cases of SO2 intoxication may interfere with the carbohydrate metabolism, thus accounting for hyperglycemia and disturbances of glycogen synthesis in the tissues. Animals exposed to the reaction products of SO2 with ammonia had a statistically lower mortality rate. The chemica reaction of SO2 with ammonia reduces the disturbances of the acid- base equilibrium observed in SO2 intoxication and eliminates the enzymatic disturbances in the blood and tissues noted in SO2 intoxication. (Author abstract modified)

26317

Gelperin, N. I., V. M. Tarasov, and A. Yu. Valdberg

REMOVAL OF HYDROGEN FLUORIDE FROM GASEOUS MIXTURES WITH THE AID OF FLUIDIZED BED SCRUBBERS WITH SPHERICAL PACKING. (Ochistka gazov ot ftoristogo vodoroda v scrubberakh s psevdoozhizhennoy sharovoy nasadkoy). Text in Russian. Khim. Prom. (Moscow), no. 10:62-64, 1970. 4 refs.

A fluidized-bed scrubber designed to remove hydrogen fluoride from exhaust gases generated during electrolytic production of aluminum is described. A 40-50 g/l sodium carbonate solution was used at an irrigation density of 2.2-31 cu m/sq m/hr, a linear gas flow rate of 2.2-5.6 m/sec, and an initial HF concentrations of 15-150 mg/cu m. The static column packing height was variable from 35 to 175 mm. Operating characteristics in terms of the unit transfer number, defined as the logarithm of the ratio of HF concentrations before and after scrubbing, are presented.

26521

Maehara, Hirohumi and Takayoshi Adachi

STUDY ON THE IONIC WIND IN THE CORONA DISCHARGING FIELD FOR THE ELECTRICAL PRECIPITATOR. (1ST REPORT). (Denkishujinki no koronahoden denkai ni okeru ionfu ni tsuite no kenkyu. Dai-1-po). Text in Japanese. Yamaguchi Daigaku Kogakubu Kenkyu Hokoku (Mem. Fac. Eng. Yamaguchi Univ.), 20(3):385-392, March 1970. 13 refs.

An experiment was conducted to observe the influence of the ionic wind on the collecting force in the corona discharging field of an electric precipitator. The first step was to investigate the nature of the ionic wind in the corona discharging field in the atmosphere. Only negative corona was used, since electric precipitators only involve negative corona. One-pin, 7-pin, or a cylinder electrode was used as the discharging electrode, and a wire net or a plate was used as the collecting electrode. The distribution of ionic wind velocity and that of corona current density were compared and the relationship between ionic wind velocity and the applied voltage was observed. Within the discharging field (3 - 6 kV/cm) of an ordinary electric precipitator there is no saturation of ionic wind velocity, althoug there were some fluctuations. Although ionic winds could possibly lower the efficiency of a precipitator, depending on the type of precipitators or dust to be collected, it might be very effective.

26593

Eisner, Joachim H.

ELECTRIC FILTERS FOR DUST EXTRACTION ON ACID REGENERATION PLANTS. (Elektrofilter zur Entstaubung von Saeureregenerations-Anlagen). Text in German. Wasser Luft Betrieb, 14(12):508-511, 1970.

Used-up acid from steel pickling baths is regenerated by dispersing it in high turbulence reactors where the free acid and water are vaporized and the iron chloride is converted to Fe2O3 and gaseous hydrochloric acid at 440 C in the presence of oxygen and steam. The extremely fine iron oxide is separated by a specially designed electrofilter which in continuous operation separates 99 to 99.8% Fe2O3. All parts of the dry filter are, in spite of the high HCl content of the gas, made of steel which is accomplished by insulation of the filter and by heating and rinsing of all insulators with preheated air. Gas temperature must never reach or fall short of the dew point of the acid which, depending on the plant, lies between 110 and 150 C. The discharge electrodes constructed in the form of so-called Bicorona flat steel electrodes account for the high degree of iron oxide separation. The electrofilter processes crude gas with a 20 to 30 g/N cu m dust content to a residual dust content of 100 mg/cu m.

26670

Kaupert, Andrew W., George E. Cheklich, and Floyd Lux

MODIFIED I-C ENGINE REACHES PROPOSED 1980 EMISSION GOALS. Automotive Eng., 79(2):20-23, Feb. 1971.

The stratified charge Ford Combustion Process engine almost meets 1975 federal emission standards in an M-151 vehicle and, by adding a commercially available catalytic converter, it reaches 1980 goals. Stratified charge basically utilizes fuel efficiently and thus produces considerably less exhaust pollution than a carbureted engine without controls. Very little fuel reaches the walls of the cylinder, leading to reduced quenching and less production of unburned hydrocarbons. Lean overall mixtures minimize formation of carbon monoxide and nitrogen oxides. The correct amount of air for minimum emissions from this engine is an almost constant air/fuel ratio of 17-18/1. Mid-air quenching and temperature control are discussed. Basics of the Ford Combustion Process are described, including timing for both spark and ignition. The Texaco Combustion process is also described, as well as turbocharging.

28117

Zin'kovskii, M.

THE STRUGGLE AGAINST DUST AT THE FERROUS METALLURGY ENTERPRISES. Metallurgist USSR (English translation from Russian of: Metallurg.), no 2:75-76, Feb. 1969.

For many technological operations in ferrous metallurgy, no technical solutions have yet been found for preventing the release of dust. An immediate task is the development of a mathematical description of the aerodynamical processes of propagation of dust from point and linear sources for different air currents. The adopted systems of dust elimination, aspiration, and ventilation and the apparatus used require thorough mathematical investigations. The time has also come for the development of a single organization framework for the dust ventilation services for metallurgical enterprises, and the organization of planned training of cadres for them by a system of technical training at the works.

28146

Yanagi, Fusao

DISPOSAL OF SEWAGE SLUDGE INCINERATION ASH OR THE LIKE. (Gesuidodei tono shokyakubai no shoriboho). Text in Japanese. (Ishigaki Machineries Co., Ltd. (Japan)) Japan. Pat. Sho 45-39317. Dec. 10, 1970. (Appl. Aug. 15, 1966, claims not given).

An effective disposal method for the ash produced from incineration of sewage or industrial waste sludge is described. In the dewatering or dehydration of sludge or the like by means of a vacuum filter, coagulants such as iron chloride or iron sulfide and slaked lime are generally added to the sludge to cause flocculent masses to form. Thereafter the sludge is filtered to remove the solids and incinerate them. However, ash is produced in large quantities as a result of the incineration, while bad odors and poisonous gases are also generated when heavy oils or the like are utilized as auxiliary fuel. In the present method, sludge treated with coagulants and filtered for dehydration is incinerated at 800 C or higher. By means of a cyclone, the ash is separated into that chiefly composed of calcium oxide and that composed of ferric oxide. The CaO is recovered and used as coagulant to induce flocculant masses to form in the sludge to be filtered; the Fe2O3 ash is mixed with water and used as a reaction agent for hydrochloric acid and sulfurous acid gas generated from the incinerator, thus forming iron chloride. The solution is then separated into solid and supernatant. Only the acid supernatant containing iron is recovered and utilized as a coagulant for the raw sludge.

28392

Bauer, Hans-Dieter and Hans-Guido Klinkner

THE EFFICIENCY OF SURFACE ACTIVE SUBSTANCES IN WET DUST SUPPRESSION AT A COAL BAGGER. (Die Wirksamkeit oberflaechenaktiver Stoffe bei der nassen Staubbekaempfung an Walzenschraemladern). Text in German. Glueckauf (Essen), 107(5):161-169, March 4, 1971. 13 refs.

Experiments were carried out on a coal bagger with wet dust suppression. The efficiency of dust suppression with and without a wetting agent in the water was tested. The wetting agent Lessageene Z 100 was added in quantities of about 0.08%. Dust supression was clearly improved by use of the wetting agent and a spraying speed of 100 l/min. Far more dust was suppressed under these conditions than by double spraying the amount of water, i.e., 200 l/min without the wetting agent. This applied to the entire range of grain sizes of dust particles, fine as well as coarse.

28499

Sprung, Siegbert

THE BEHAVIOR OF SULPHUR DURING THE FIRING PROCESS OF CEMENT CLINKER. (Das Verhalten des Schwefels beim Brannen von Zementklinker). Tonind. Ztg., 89(5-6):124-130, 1965. 19 refs. Translated from German. Belov and Associates, Denver, Colo., 24p., Dec. 18, 1970.

The sulfur dioxide concentration in flue gas from cement furnaces is considerably lower than could be expected according to the sulfur concentration of the raw materials and the fuel used in the firing process. In laboratory experiments, the reaction of calcite and SO2 was tested; in industrial experiments, the alkali- sulfur balance for various furnaces was established. In a temperature range of 400-500 C, calcite reacts with SO2 and leads to the formation of calcium sulfate. The conversion rate can be increased by an increase in temperature, enlargement of the specific surface area of the introduced powder, and by the presence of water vapors during the gas phase. At first, a phase contact surface reaction occurs; after enclosure of the calcite- kernal by CaS04, diffusion reactions become a deciding factor of speed. The SO2-emission and the alkali and sulfur utilization of two Lepol furnaces, three gas suspension-heat exchanger furnaces and one shaft furnace using coal or oil as fuel were determined. It was shown that 79-98% of the sulfur output in the clinker occurred as sulfate. A nearly linear relationship between the alkali-sulfur trioxide ratio in the furnace gas phase and the SO2-emission was found. This SO2-emission can be reduced in the furnace gas phase by an increased amount of alkali. By gas suspension-heat exchanger furnaces, the SO2-emission can be reduced to below 160 mg/N cu m by the addition of a mill drying plant which is powered by the flue gases. (Author summary modified)

28502

Prime Minister, Delegation for Scientific and Technical Research

SCIENTIFIC AND TECHNICAL MEANS OF DIMINISHING POLLUTION, INHALED OR ASSIMILATED FROM THE ENVIRONMENT--AND OF DIMINISHING ACOUSTICAL INTERFERENCE. (Moyens scientifiques et techniques de diminuer la pollution des milieux inhales ou ingeres et des 'nuisances' acoustiques). In: Pollution and Acoustical Interference of Industrial and Urban Origin. (Les pollution et 'nuisances' d'origine industrielle et urbaine). Vol. I, Paris, France, June 1966, Chapt. 3, p. 47-59. Translated from French. Belov and Associates, Denver, Colo., 49p., Oct. 13, 1970.

Aspects of natural and technological control methods for air, water, and noise pollution are discussed, with suggested topics of research given for each. Plants have an ability to function as air purifiers, within the limits of their toleration to various individual pollutants. The effects of such pollutants as ethylene, carbon monoxide, sulfur dioxide, and fluorides on plants are described. The purifying action of water plants and bacterial beds has application to water purification in treatment facilities as well as in natural fresh water bodies. Purification processes within the bed of a lake are also considered. Control methods for suspended particulates from industrial and domestic sources including separators, filters, and electrostatic precipitators, are briefly noted, while the various design, operational, and control device techniques now under study for control of motor vehicle emissions, particularly storage batteries for electric propulsion, design modifications and catalytic afterburners, are considered at length. Also discussed are pretreatment of industrially polluted waters, potential uses of water treatment sludge, and means for preventing and/or absorbing noise in residential, business, and industrial areas.

28532

Sedach, V. S., G. S. Nosko, Ya. D. Semisalov, and N. A. Polkovnichenko

INCREASING SCRUBBER THROUGHPUT BY MODERNISING THE NOZZLES. Coke Chem. (USSR) (English translation from Russian of: Koks i Khim.), no. 70:47-48, 1970. 3 refs.

The possibility of improving the design of the nozzles used in benzole scrubbers was investigated in order to give better atomization and increase the volume of liquid absorbent with installing more nozzles. By adjusting the live sections of the spray nozzles, it has been possible to increase the wash oil throughput by 11%. The modernized nozzles distribute the spray more uniformly over the top of the grid packing in the scrubber, and their useful life is much longer. The extra power consumed by the new nozzles is within the capacity of the pumping equipment already provided. (Author conclusions modified)

28599

Peters, Werner

THE POTENTIAL FUTURE OF COAL BY NEW PROCESSES OF ENERGY CONVERSION. (Chancen fur die Kohle durch neue Verfahren zur Energieumwandlung). Preprint, Steinkohlenbergbauverein (West Germany), 10p., 1968. Translated from German by Belov and Associates, Denver, Colo., 11p., Dec. 3, 1970. (Presented at the Steinkohlenbergbauverein, Members Convention, Essen, West Germany, Dec. 17, 1968.)

Three scientific innovations in coal processing are described and evaluated: the whirling layer heating system; magnetohydrodynamic (MHD) energy conversion; and coal combustion with process heat from a nuclear reactor. The efficiency of the whirling layer heating system is brought about by the complete combustion of fine coal (granulation 0-3 mm) kept in suspension in warmed air. Desulfurization of the smoke gas can be achieved by the addition of fine grain limestone to the coal. This system can be expected to lower electricity production costs by approximately 10-15%. A pilot plant will start production in 1970. The MHD energy conversion system is advanced far beyond traditional techniques. It depends on the ionization of hot smoke gas (above 2500 C) which is then driven through an electromagnet. The loss of temperature and pressure is converted into electric current. The MHD generator used as an aggregate to a conventional power plant will increase total efficiency as much as 60%, thus reducing electricity production expenses by 12-25%. Coupled with a continuous coking plant, the MHD generator would lead to coke production with no by-products except the production of electric current. A prototype MHD generator is in use in the U.S.S.R. The functional realization of the whirling layer heating system and the MHD generator can be expected in the mid-1970's, at the earliest. The method of carburetion of coal with process heat from nuclear reactors will be used for the economical production of raw material for the chemical industry from coal, synthesis gas, or hydrogen. The advantage of this method is that 30,40% of the coal which would otherwise be necessary for the production of fine synthesis gas is replaced by less expensive reactor heat. Also there is no necessit for using oxygen, as is required for traditional methods of coal carburetion. Technical realization of this method is far off, but the goal is reachable. Carburetion through nuclear heat can be expected by the 1980's.

28642

Ganieva, T. F., M. S. Belen'kii, and M. Yu. Sultanov

INVESTIGATION OF THE MECHANISM OF CARBON MONOXIDE OXIDATION AND DEGRADATIVE HYDROCARBON OXIDATION OF AN ALUMINUM-COPPER- CHROMIUM OXIDE CATALYST BY A TWO-STAGE CALORIMETRIC METHOD. Kinetics Catalysis USSR (English translation from Russian of: Kinetika i Kataliz, 11(5):992-994, Sept.-Oct. 1970. 4 refs.

The mechanism of oxidation of C2-C3 olefins, butane, and carbon monoxide on an aluminum-copper-chromium oxide catalyst was studied by a two-stage calorimetric method at 200-900 C. These temperatures correspond to those involved in the detoxification of exhaust gases of gasoline engines. Carbon monoxide and butane were oxidized on the catalyst surface at both low and intermediate temperatures. Only at 600 C did a gas-phase oxidation appear, and it proceeded independently of the presence of the catalyst. Degradative oxidation of the olefins took place on the catalyst surface at low temperatures, but a heterogeneous-homogeneous reaction involving a surface-volume mechanism occurred at intermediate temperatures. At high temperatures, oxidation of the olefins proceeded mainly in the gas phase.

28683

Ito, Kaname, Shoichi Miyoshi, and Tamotsu Yamada

REACTION OF SO2 GAS AND MANGANESE DIOXIDE. Translated from Japanese, Franklin Institute Research Labs., Philadelphia, Pa., Science Info. Service) 2p., Oct. 30, 1969.

An improved method for the removal of sulfur dioxide, and more detailed information about the reaction of SO2 with synthetic activ manganese are presented. Five kinds of synthetic MnO2 and one kind of natural MnO were used as samples. The velocity of their reaction with SO2 was measured with a thermobalance, and the change in reaction time measured from the increase in weight. The curves of the log of the pressure of SO2 versus reaction time show that for the chemically synthesized samples which have a larger surface area, the reaction velocities with SO2 are fairly rapid. In fully crystallized samples or natural samples, the reaction velocities are comparatively slow.

28684

Nakai, J.

THE DEVELOPMENT OF DESULFURIZATION PROCESS BY INDUSTRIAL RESEARCH INSTITUTE OF KANAGAWA PREFECTURE. Ryusan To Kogyo (Sulfuric Acid and Industry), p. 1-4, 1969. Translated from Japanese, Belov and Associates, Denver, Colo., 9p., April 30, 1970.

The multi-purpose gas absorber for sulfur dioxide is suggested and evaluated as the only practical machine ready for installation for plume dehydration. Reasons for its choice and criticisms were presented. A diagram of the apparatus is given and the layout of the desulfurization installation is shown. Curves for the solubility of sulfur dioxide are plotted. The manufacture of a larger machine, with a capacity of 30,000 to 100,000 cu mm/h is being planned.

28686

Yoshida, Konen, Ino Kunisachi, and Shigeki Wakabayashi

REMOVAL OF SO2 IN EXHAUST GAS AND PRODUCTION OF MIXED PRECIPITANT. Translated from Japanese, Franklin Institute Research Labs., Philadelphia, Pa., Science Info. Services, 4p., Oct. 30, 1969.

Inexpensive raw materials for use in the mixed precipitation method of treating industrial waste water and at the same time preventing air pollution were investigated. The exhaust gas used was a mixture of sulfur dioxide, air, and nitrogen gas, which was passed through a layer of vanadium catalyst to produce sulfuric acid by a contact method. The SO2 was converted to sulfur trioxide. A mixture of red sludge, open-hearth furnace slag, and 5% kaolinite was made into a paste, extruded from a large injection tube, and then dried. The same process was used for a mixture of aluminum oxide, obtained from the recovery of aluminum ground metal from scrap aluminium, and 20% kaolinite. The products were reacted with the exhaust gas, and the soluble component thus obtained was fade-tested using a direct orange dye. The results of the SO2 removal and of the fade tests are tabulated.

29273

(Inventor not given.)

PROCESS FOR THE SEPARATION OF SULFUR FROM GAS. (Procede pour l elimination du soufre contenu dans le gaz). Text in French. (Parsons (Ralph M.)Co., Nev.) French Pat. Appl. 69-28844. 13p., Aug. 22, 1969. (8 claims).

The process described separates hydrogen sulfide and sulfur dioxide from gas emanating from the Claus process, and hydrogen sulfide from gas mixes obtained by partial oxidation of coal, oil, or other carbonaceous material for the synthesis of ammonia. The gas is at temperatures from 150 to 400 C brought in contact with ferric oxide fixated on a base material which contains from 10-40% iron trioxide. Ferric sulfide forms which is subsequently oxidized by hot air to sulfur, ferric oxide is recovered. The reactive mass forms a mobile bed which is continuously being recycled between the contact and the regeneration zone. In the contact zone at least part of the SO2 reacts with the ferric sulfide, also yielding ferric oxide and elementary sulfur. The desulfurized gas escapes into the atmosphere. The vaporized sulfur contained in the gas issuing from the regeneration zone is condensed and deposited in a cooling chamber. The process can be so modified that it takes place in a single converter.

29278

Alferova, L. A. and G. A. Titova

OXIDATION OF SODIUM SULFIDE AND MERCAPTIDE IN BLACK LIQUOR. Bumazhn. Prom. (Moscow), 41(10):5-6, Oct. 1966. Translated from Russian by Brenda Jacobsen, Washington Univ., Seattle, Dept. of Civil Engineering, 11p., Oct. 31, 1970.

To determine optimum conditions for black liquor oxidation, aqueous solutions of hydrogen sulfide, methyl mercaptan, and their salts were oxidized by aeration at various flow rates and temperatures and within a wide range of pH. For all solutions, the rate of oxidation was determined mainly by temperature and area of contact between the solution and oxidizing agent. Both hydroxone and hydroxyl ions had a catalytic action on the rate and mechanism of oxidation. To achieve a large contact area, aeration should be carried out in an atomizing-type apparatus. Temperature should be 80 to 100 C and pressure 4 to 5 kg/sq cm. Under these conditions, the rate of oxidation is determined by the value of the pH and of the ionic salt of the black liquor. The final pH must not be lower than 12.5, as at a lower pH other oxidation products (thiosulfates, sulfites, polythionates, etc.) predominate. The oxygen consumption under optimum conditions is approximately equal to theoretical calculations. (Author abstract modified)

29387

Kato Jun, Hideo Ose, Morio Suzuki, and Kazuo Shimada

DIRECT DESULFURIZATION OF HEAVY OIL BY CIRCULATION TYPE UPWARD FLOW REACTOR. (Junkan gata uwamukiryu hannoki ni yoru juyu no chokusetsu datsuryu). Text in Japanese. Preprint, Japan Society of Chemical Engineering, 5p., 1970. 2 refs. (Presented at Japan Society of Chemical Engineering, General Symposium 9th, Nagoya, Japan, Nov. 25-26, 1970, Paper B-3-4.)

Heavy oil direct desulfurization methods used industrially in Japan include the RCD Isomax process, the Gulf-Residual hydrodesulfurization process, and other fixed-bed types. While the heavy oil fluidized-bed technique solves the problems involving reaction heat control and catalyst life inherent in fixed-bed methods, it increases the quantity of heavy oil recirculation in order to liquefy the catalyst. This results in a near-perfect mixture flow, because the reaction efficiency is lower compared with piston flow. If the old catalyst can be removed from the bottom of a catalyst layer standing still in the upward flow without stopping the operation, it will not be necessary to liquefy the catalyst. And therefore the quantity of heavy oil recirculation can be kept to a minimum, making the flow similar to a piston flow and advantageous for higher reaction efficiency. A moving-bed desulfurization (MDS) process is described in which a stationary layer of spherical pellet catalysts are partially replaced with fresh catalysts fed intermittently while the old catalyst is removed at the bottom. The process permits a higher reaction efficiency due to a lower heavy oil recycle ratio and a small high temperature separator and oil circulation pump due to reduced oil circulation. A larger quantity of catalyst can be put in the reactor, and the fresh catalyst installed from above moves downward as the old catalyst is removed from the bottom so that the new catalyst may be kept in at all times. Since the raw heavy oil flows upward to contact the older catalyst in the bottom of the catalyst, the deleterious substances to the catalyst are first filtered by the older catalyst. A cooling device required for control of the reaction heat, as with the fixed bed type is the main disadvantage.

29601

Shigeta, Yoshihiro

ODOR TREATMENT AND ITS COST AT RENDERING FACTORIES. (Kaseijo no akushu shoriho to sono hiyo). Text in Japanese. PPM (Japan), 2(5):78-85, May 1971. 6 refs.

At rendering factories, the raw material should be placed in a concrete pit, 2-3 m underground, with a V-shaped bottom. At the bottom, a screw conveyor is installed through which the raw materia is sent to the crusher. The pit can be equipped with a lid. Although a stone separator and metal detector can eliminate stone, gravel, and metal, such things as vinyl, cloth, and rope have to be eliminated by hand. Dead animals, animal bones, and large fish, ar put into the hasher before they are put in a cooker. These machine save labor, and the processes can be air tight. The continuous cooker is operated at 80-90 C for 10-20 minutes for fish offal. Animal bones and feathers are placed in a dry rendering plant. After cooking, a screw press removes 30-35% of the water from the fish offal and the fish cake is dried. The water is desludged. The animal bones and feathers are dried to decrease their water content to 6-10%. If an expeller is used for the fish offal to decrease the water content to 45-55%, the odor is decreased. The water removed from the offal should be utilized as fish soluble, as it contains 3-6% protein. The odor can be treated by combustion, activated coal, ozone, or oxidation catalyst methods, a neutralizer or masking method, or dilution. The cost of these methods is calculated.

29639

Theodore, Louis and James Pardini

DESIGN OF AN ELECTROSTATIC PRECIPITATOR USING MODELLING AND SIMULATION TECHNIQUES. Proc. North Eastern Regional Antipollutio Conf., Kingston, R. I., 1969. 7 refs. (July 22-25.)

Six mathematical models are developed for three different flow regimes encountered in plate and tubular electrostatic precipitators. The flows considered are plug, laminar, and turbulent. In each case, the model is solved for the height of the precipitator necessary to ensure 100% collection efficiency. The calculated results from a digital simulation are compared with those obtained using standard design techniques. The results of the simulation can be used to evaluate the effects of new and/or different precipitator geometries, aerosol properties, and electrostatic conditions. This work may serve as guide to the proper design and selection of electrostatic precipitators.

29802

Mironov, A. M., I. P. Mukhlenov, and V. M. Pomerantsev

REMOVAL OF CHLORINE FROM GASES. J. Appl. Chem. USSR (English translation from Russian of: Zh. Prikl. Khim.), 43(11):2556-2557, Nov. 1970. 5 refs.

The catalytic conversion of gaseous chlorine to hydrogen chloride was studied using methane or propane as the reducing gas and the following catalysts: powdered brick, alumina gel, Fe2O3 on alumina gel, and Cr2O3 on alumina gel. The chlorine concentration of the gas was maintained at about 1%. Almost complete conversion of chlorine to hydrogen chloride was obtained at about 250 deg when propane was used in the presence of chromium oxide on alumina gel. The temperature of the gas entering the reactor need not be above 150 deg. It can be lowered substantially below this if the process is conducted in a fluidized catalyst bed. The catalytic process thus provides a radical solution to the problem of decontaminating waste gases from chemical and metallurgical industries, especially gases from magnesium production.

29824

Norden, H.

MODERN OIL BURNING TECHNOLOGY AS DISPLAYED ON THE INTHERM IN STUTTGART AND THE 6.ISH IN FRANKFURT 1971. (Moderne Oelbrenneteechnik nach dem Stand der Intherm in Stuttgart und der 6.ish in Frankfurt 1971). Text in German. Oel Gasfeuerung, 16(5):546-552, 1971.

The capacity of heavy fuel oil burners has been increased to 9 t/hr, which allows large plants to be equipped with fewer burners. Continuous regulation can maintain soot-free combustion with the smallest air surplus. Because of increased air pollution concern, oil gasifiers, blue flame burners, combusters, and semi-combusters are gaining importance. Also, the familiar principle of water-in-oil emulsions for soot prevention has gained great interest; this functions when the water droplets in the fuel oil are smaller than the smallest atomized oil droplets. With the aid of thermally decomposed water in the flame, the air surplus can be reduced without soot formation, less sulfur trioxide develops, and the danger of low-temperature corrosion is reduced. Water-containing waste oils can be burned as emulsions if they contain more than 50% combustibles. If this is not the case, fuel oil or gas must be added. Burners which take two or three different types of fuels have come increasingly into use. Since natural gas is now preferred over the fuel oils, the natural gas prices will rise.

30043

Garlet, Robert

ELIMINATION OF OXIDES CONTAINED IN CERTAIN RESIDUAL INDUSTRIAL GASES. Preprint, National Industrial Nitrogen Office (France), 1968 (?). Translated from French. 7p.

The determination of nitrogen oxides is difficult in the course of nitric acid synthesis by ammoniac oxidation. Recently a process has been developed which destroys nitrogen oxides by reducing them catalytically at about 400 C. However, this requires large investments and a lot of equipment, and it is difficult to resolve this problem economically because of the large quantities of water vapor in the residual gases. A new invention washes the gases at ordinary temperature and pressure, is more economical, and emits a nitrogen dioxide content of less than the toxicity threshold (10 ppm). Ammonia solutions can be used to purify gases with sulfurous and anhydride by reacting to form ammonia sulfate. The molor bisulfite/sulfite ratio of the washing solutions should not exceed 0.1 to 0.4. The gas flow can be 1300 to 1500 volumes of gas per useful volume of washing. Treated gases are practically odorless and colorless; a mist of white vapor can be eliminated by electrostatic precipitation. Then ammonia sulfate can be crystalized and extracted.

30048

Feldmann, H. F., W. H. Simons, J. J. Gallagher, and D. Bienstock

KINETICS OF RECOVERING SULFUR FROM THE SPENT SEED IN AN MHD POWER PLANT. Am. Chem. Soc., Div. Fuel Chem. Preprints, 13(2):13-26, 1969. 7 refs. (Presented at the American Chemical Society Division of Fuel Chemistry, Joint Symposium on Fuel and Analytical Chemistry, Minneapolis, Minn., April 13-18, 1969.)

Because of the high affinity that potassium or cesium seeding materials have for sulfur and their easy regeneration, sulfur can be profitably recovered from an open-cycle magnetohydrodynamic power plant. The sulfur with hydrogen (as hydrogen sulfide) can be removed from the seed-slag mixture, thus leaving a sulfur-free effluent gas. A slag-seed mixture was simulated and reacted with hydrogen. Then the sulfur removal rate was calculated from a formula. A kinetic model was formulated from the experimental observations. The reaction rate and maximum conversion level depended on temperature. The model was applied to the regeneration of alkalized alumina; similar techniques for regenerating alkalized alumina can be used to remove sulfur from seed-slag mixtures. The economic feasibility of sulfur removal from recycling seed-slag mixtures was also discussed.

30091

Davydov, A. A., Yu. M. Shchekochikhin, and N. P. Keier

INFRARED SPECTROSCOPIC STUDY OF THE CATALYTIC OXIDATION OF CARBON MONOXIDE TO CARBON DIOXIDE ON MANGANESE DIOXIDE. Kinetics Catalysis (USSR) (English translation from Russian of: Kinetika i Kataliz), 11(5):1019-1023, Sept.-Oct. 1970. 7 refs.

The formation and transformation of surface compounds in the oxidation of carbon monoxide on manganese dioxide have been studied by infrared spectroscopy. The reaction was found to take place with the participation of adsorbed oxygen and gaseous CO; these form carbonate structures of different types, which decompose with the formation of carbon dioxide. The desorption temperature of the carbonate structures is lower when the reaction is carried out under static conditions than when the oxidation is carried out in the adsorbed layer. (Author abstract)

30104

Goryachev, I. K.

FILTER FOR COLLECTING CARBON BLACK. Soviet Rubber Technol. (English translation from Russian of: Kauchuk i Rezina, 28(12): 46-47, Dec. 1969.

An experimental bag filter for collecting fine carbon black particles from a carbon black/gas mixture was developed with two filter sections consisting of cells for purified and unpurified gas. The cells were formed by sewing together panels of fabric and stretching them on a special frame. In the upper part of the filter, a purified gas collector contains air-distributing tubes with nozzles on the same axis as the cells for the purified gas. The air-distributing tubes are connected, through an electromagnetic valve, to a receiver of compressed air. When a certain hydraulic pressure is reached, the electromagnetic valve is activated and bursts of compressed air pass into the distribution tubes. The jet of air ejects the purified gas in the collector into the cavity of the shell. When the fabric is shaken, simultaneous back-flow occurs. During nine months of operation, no clogging of the cells with carbon black was observed. The average degree of contamination at the exit from the filter was 0.01 g/cu m, and the optimum rate of filtration was 1.0 m/min. The filter can be used to purify air at temperatures not exceeding 70 C.

30276

Lux, Herbert and Hardi Stange

RESULTS OF FIVE-YEAR EFFORTS FOR REDUCTION OF FLUORINE EMISSIONS. (Ueber Ergebnisse fuenfjaehriger Bemuehungen un die Verminderung von Fluoremissionen). Text in German. Chem. Tech. (Berlin), 23(4/5):264-266, April/May 1971. 2 refs.

When various methods were investigated for the removal of hydrogen fluoride from waste gases, such as packed columns and absorption on activated charcoal or limestone, it was found that absorption was not efficient. The use of packed towers requires that the flow rate not exceed one m/sec. Each packed tower must be operated with an alkaline solution; a five to 10% sodium or potassium lye solution can be employed. While packed columns are easy to maintain, some production processes have waste gases which carry dust that may form insoluble products with the scrubbing fluid. Dust collectors should precede the packed tower in such cases. It is also advantageous to force the gases through the tower, to avoid some of the problems which its moveable parts may present.

30526

Tamori, Yukuo

CHECK POINTS FOR OPERATING DUST COLLECTORS. (Shujin sosa no tameno kento jiko). Text in Japanese. Kogai To Taisaku (J. Pollution Control), 6(2):105-109, March 1971. 8 refs.

The concentration of a dust is represented by weight (g/cu m) in unit volume. If the dust is extremely dilute, particle count (particle/cc) per unit volume is employed. The Air Pollution Control Act sets standards for dust concentrations according to source classification. Grain size distribution is represented either by frequency or by integration. Microscopic, screening, pipet, sedimentation, or light transparency methods are employed for the determination of particle size distribution. True and volumetric specific gravity is defined. Adhesivity, electrical resistance, angle of friction, particle configuration, surface roughness, hygroscopic properties, corrosion resistance, toxicity and explosivity, and dynamic characteristics of particulates are described. Free fall velocity in atmosphere is diagrammatically shown, together with the Cunningham correction. Normally the gas temperature is extremely high, being 200-600 C at the dust collector. With dust collectors utilizing gravity, inertia, or centrifugal force, particle velocity decreases at high temperatures because of the increase in viscosity. Also, the pressure loss increases, resulting in lower collector efficiency. The recently developed high-temperature bag filter is usable up to 300 C. Estimation of the gas quantity to be processed, water content, and the effects of sulfuric anhydride are also explained.

30606

Nietzold, Ingo

STATUS AND TENDENCIES OF AIR FILTRATION IN THE G.D.R. (Stand und Tendenzen der Luftfiltration in der DDR). Text in German. Chem. Tech. (Berlin), 23(4-5):238-243, April-May, 1971. (Presented at the Colloquium Reinhaltung der Luft, 11th Woche der Kammer der Technik, VEB Chemiefaserkombinat Wilhelm Pieck Schwarza, Oct. 27, 1970.)

Third generation dust filters (1965-1975) for compact continuous filtration, filter housings with removable filter panels for 500 to 20,000 cu m air/hr, classification of filters by their performance, the systems concept of air filtration, the trends discernible in filter development, electrofilters, and the filter supply situation and their importation into East Germany are reviewed. Third generation dust filters have a frame size of 710 by 460 mm, process 3000 cu m air/hr which corresponds to a flow velocity of 2.55 m/sec. Filter assemblies come in 24 sizes with the largest having a capacity of 420 000 cu m air/hr. The filtering material consists of a fleece of polyester and polyamide fibers lined by malimo gauze tighly stretched over rollers in several folds within the filter frame. Dust-laden filter material, replaced by fresh fleece by winding a roller, is descarded. Aerosol filters are currently being officially tested by means of radioactively marked aerosols. The AFI code is not used in the G.D.R. A new system is proposed which classifies filters by their separation power of silica dust, oil fog, and radioactively marked aerosols and stipulates the test procedure to be used in each case. The trend is away from reusable towards disposable filters, even though the cost is higher. Electrofilter production and use has declined because of their frequent malfunctions, even though their usefulness in fine dust removal is generally recognized. The importation of foreign, even of superior filters is being discouraged.

31078

Franzky, U.

WHAT DO WE MEAN BY TECHNOLOGY FOR THE MAINTENANCE OF CLEAN AIR? (Was versteht man unter Luftreinhaltetechnik). Text in German. Wasser Luft Betrieb, Sonderheft PRO AQUA - PRO VITA, June 1971, p. 46-47, 14 refs.

The technology for maintenance of clean air comprises all methods for removal of solid, liquid, or gaseous emissions. Measures reducing emissions start with the selection of the raw material and include modifications of the production process, construction and dimensioning of waste-gas exhaust systems, equipment for cleaning the waste gases, and all facilities for discharging the clean waste gas. Monitoring and equipment maintenance are also control measures. The operating range of dust collectors covers dusts with grain sizes of 0.01 micron to dusts with sizes of more than 1000 micron. Dust concentrations in waste gases can be easily reduced to 150 mg/cu m for nontoxic dusts and to less than 100 mg/cu m for toxic dusts. Settling chambers are primarily used for preliminary collection of large-grained dust. The collection mechanism of filters is to a large extent still unknown. It is assumed that impaction of large particles occurs and that fine dust is retained through diffusion and electrostatic forces. The collection efficiency of mechanical dust collectors can be improved by enlarging the mass of the dust particles. This can be achieved by binding the particles to a fluid. Electrostatic precipitators are preferrably used for cleaning large waste gas flows. Gas-cleaning methods are based on physical processes or are connected with chemical reactions. The physical methods include dilution, condensation, absorption, and adsorption; the chemical methods, oxidation processes.

32099

Japan Environmental Sanitary Center, Tokyo

REPORT OF THE STUDIES OF THE PREVENTION OF OFFENSIVE ODORS (NO. 3). (Akushuboshi ni kansuru kenkyu hokokusho. (Dai III ho)). Text in Japanese. JESC-42-076. 82p., March 1968.

Environmental pollution problems in every Japanese prefecture include offensive odors from fish meal plants, fish manure mills, and factories for drying chicken droppings. The condition of deodorizing equipment installed in such factories, methods for measuring offensive odors, and future countermeasures were surveyed. Eight models of deodorizing equipment were tested. Construction and maintenance costs of these models are tabulated along with data for currently installed equipment. Since deodorizing equipment associated with a single method does not effectively eliminate odors, deodorization by a combination of methods was postulated. Gas chromatography was adopted as the main method for measuring an offensive odor and as the method for collecting samples. Sampling amines, mercaptans, and organic acids by glass-bead tubes is also described, and results are reported for actual measurements. Based on investigations of the sources of offensive odors at 25 mills, the chief constituents of basic offensive odors are ammonium and trimethylamine. Other low-grade amines were scarcely observed. The usual rate of ammonium and trimethylamine in emission sources is between 1 to 10 and 10 to 1 in fish meal plants and one to one in the factories for drying chicken droppings. In some cases, exhaust concentrations exceeded 100 ppm. Six types of deodorizing equipment were observed, but almost no factory had a satisfactory blueprint for eliminating pollution. The economics of proposed measures are discussed.

32798

Ishii, Tomio

AIR POLLUTION (ODOR) CONTROL FOR KRAFT PULP MILL WITH OZONE. (Taiki osen (shuki) to kurafuto parupu miru no ozon dasshu). Text in Japanese. Kogai to Taisaku (J. Pollution Control), 7(9):824-828, Sept. 1971. 6 refs.

A pilot odorimeter was tested in 1970 in England wherein the upper part of the test tube had a heated coil which lighted mixed gas. The flame rapidly spread below and formed dispersed light. Sample gas was passed into the tube from the lower opening and through the burner at the speed of 7 m/sec; the light continuously scattered at the narrow point of the tube and reached the upper part of the water jacket which enveloped the tube. The intensity of the light was photoamplified and was sent to a penrecorder. At the test site, methylmercaptan was discharged for five minutes at a height of two meters from the ground, 100 meters windway from the measuring point. The record showed a wave pattern with six or seven large peaks, probably due to the breeze. But the test was deemed successful. In the United States, the Kraft Pulp Mill's deodorization process by ozone is an example of successful treatment of industrial odor problems. In the process of chemical digestion of pulp, hydrogen sulfide and methylmercaptan are emitted and create odor. According to a study, 1000 kg of pulp creates 114.2 g H_2S and 824.1 g of mercaptan at the Kraft Pulp Mill. The main sources of emissions are the stacks of the black liquor combustion furnace; discharge from the digester; waste gas from the blowdown; and the non-condensable materials from the evaporator and vacuum pumps. Oxidation of the gas from the black liquor stack solved that particular problem, but the main source of odor was the blowdown which oxidation did not help. More recently, waste gases at this mill are treated through condensers where ozone is added to the gas at the entrance and exit, and has proved successful. The duration of gas-ozone contact is also important, and a 2.2 sec exposure gave the best result.

32846

Kurosawa, Kenji

DESULFURIZATION OF STACK GAS BY MKK PROCESS. (MKK ho ni yoru haien datsuryu). Text in Japanese. Netsu Kanri (Heat Management: Energy and Pollution Control), 23(8):42-45, Aug. 1971.

In the MKK sulfur control process, an absorption liquid at a pH of 12 is run countercurrent to the direction of flow of the stack gases. The absorption device is a multi-stage jet scrubber which utilizes sodium hydroxide or sodium sulfite as the scrubbing solution. The absorption liquid is removed at a pH of five and sent to a reaction tank where lime is added. NaOH is produced and calcium sulfite settles out. After filtering, a good gypsum product can be produced. This method is suitable for 20-100 t/hr boilers.

33122

Honda, Akihiro

FUNDAMENTAL METHODS FOR ODOR CONTROL. (Akushu boshi no kihonteki hoho). Text in Japanese. Yosui to Haisui (J. Water Waste), 13(9):1079-1090, Sept. 1971.

Of various basic methods of deodorization, those by (1) decomposition or solution and concentration or absorption; (2) chemical deodorants; (3) adsorption; (4) ion exchange; and (5) oxidation are discussed in detail. The first method includes water scrubbing apparatus of simple water washing; columns packed with coke, Raschig rings, pipes, or ceramic balls; step towers such as multi-perforation steps, mesh-steps, lattice-steps, air-jet steps, umbrella-steps, and floating balls; and special absorption towers such as waterfilm types and cyclone scrubbers. Temperatures for concentration of various odor producing elements are given. Chemical deodorants are discussed according to various classifications such as powders, liquids, and gases; organic and inorganic methods; methods such as direct application, surface covering, aerosol contact, flow-through; and mechanisms such as psychological (masking, neutralization), physical (solution, adsorption), and chemical (concentration, superimposition, oxidation, reduction, and disinfection). Tables of deodorization effects by direct and indirect applications of inorganic deodorants and deodorization mechanisms of organic deodorants are given. Tables for the adsorption capacity of activated carbon for various odor producing elements, room sizes that one pound of activated carbon will deodorize for one year, and necessary amounts of activated carbon per person per year for various classes of facilities are included. A table is presented showing the effectiveness of various ion exchange resins. Various methods of oxidation, such as ozone, chlorine, combustion, and bacteria are discussed.

33167

Mascarello, J. M. and J. Auclair

RESULTS OF THE EXPERIMENTAL PLANT FOR WASTE GAS DESULFURIZATION IN THE E.D.F.-POWER PLANT ST. OUEN. (Ergebnisse der Versuchsanlage zur Abgasentschwefelung im E.d.F.-Kraftwerk St. Ouen). Text in German. Mitt. Ver. Grosskesselbetr., 51(4):324-328, Aug. 1971. (Presented at the Vereinigung der Grosskesselbetreiber - Fachtagung, Emissionen 1970, Wuppertal, West Germany, April 3, 1970, Regensburg, April 17, 1970, and Travemuende, April 30, 1970.)

A method is described of scrubbing power plant flue gases with ammonia, thus separating out 93-97% of the sulfur dioxide and sulfur trioxide as ammonium sulfite, bisulfite, and sulfate. These waste products are treated with lime for recovery of the ammonia which can then be recirculated. The sulfur-containing acid residues are converted into insoluble calcium sulfate which can be disposed of without danger. If no utilization of the chemical end products is foreseen, this is a very economical method for the control of sulfur oxides. The power plant St. Ouen has a pilot plant operating on this principle, which has been modified for recovery of the SO_2 as a liquid. Costs are cited.

33321

REFUSE CASO4 FROM FLUE GASES DESULFURIZATION IN COAL POWER PLANTS. (Odpadni siran vapenaty z odsirovani spalin tepelnych elektraren). Text in Czech. Stavivo, 43(11):413, 1965. 1 ref.

A method of flue gas desulfurization from coal power plants by ammonia is described, in which 90% of the sulfur dioxide is absorbed. Ammonia is recovered by lime during the formation of a dehydrate of calcium sulfate of high purity. The purity increases if lime milk is used instead of lime. About 80% of the ammonia is recovered. The process of ammonia regeneration is cheap and simple.

33616

Sato, Mitsuo, Naoki Takayama, Satoru Kurita, and Takao Kwan

DISTRIBUTION OF VANADIUM AND NICKEL DEPOSITS INSIDE THE DESULFURIZATION CATALYSTS. (Banajiumu oyobi nikkeru no datsuryu shokubai tainai eno chinseki bunpu). Text in Japanese. Nippon Kagaku Zasshi (J. Chem. Soc. Japan), 92(10):834-838, Oct. 1971. 6 refs.

The poisoning of desulfurization catalysts was investigated. Samples were taken from the middle of a two m long cobalt-molybdenum-alumina catalyst employed for the hydrodesulfurization of Kafuji oil in a fixed-layer reactor. X-ray analysis revealed nickel deposits to be distributed uniformly throughout the catalyst, while vanadium deposits were found in the vicinity of the surface of the catalyst. No difference was observed between those catalysts used for 50 hours and those used for

1000 hours. The rate of deposition was considered linearly proportional to the concentration of the compounds, and the reaction to be reversible. Once deposited, the compounds did not escape from the surface, nor move around on the surface or inside the catalyst. The deposition process is independent of the hydrodesulfurization process. Based on these assumptions, a theoretical model was derived of the deposition process. The reactivity of vanadium with the catalyst was greater than that of nickel, while the diffusion coefficient was lower for vanadium than for nickel.

33890

Brodskiy, Yu. N., V. I. Lazarev, and V. A. Pinayev

DESULFURIZATION OF SMOKE GASES. (Obesserivaniye dymovikh gasov). Preprint, EEC Work Group on Air Pollution Problems (USSR), 1970. 17 refs. (Presented at the Seminar on Desulfurization of Fuel and Flue Gas.) Translated from Russian. Leo Kanner Assoc., Redwood City, Calif., 25p., March 1971.

When heat and electric power stations, designed to burn coal containing about 2.5% combustible sulfur, began to be constructed in Moscow and other industrial centers in the 1930s, research work was started on a broad scale toward the control of sulfur dioxide emissions. Methods were tested in large experimental and industrial installations. Catalytic oxidation of sulfur dioxide produces sulfur trioxide in an aqueous medium in the presence of a manganese ore. An ammonia-autoclave method is used to absorb SO2 by an aqueous solution of ammonium sulfite-bisulfite with the subsequent decomposition of spent solutions in an autoclave to ammonium sulfate and elementary sulfur. The limestone method is based on the sorption of SO2 by suspensions of lime or active limestone, producing a mixture of crystals of calcium sulfite and sulfate. The magnesite method uses the absorption of SO2 by suspensions of magnesium oxide, producing crystals of magnesium sulfite MgSO3.6H20, which are roasted by the hot smoke gases at 800-900 C. Modifications of these methods were also tested, and additional procedures and costs are indicated.

33971

Mashita, Takashi

WET-TYPE DUST COLLECTOR UTILIZING CONDENSATION. (Gyoshuku o riyo shita shisshiki shujinki soriboru). Text in Japanese. Sangyo Kogai (Ind. Public Nuisance), 7(10):573-574, Oct. 1971.

A new, wet-type dust collector consists of a casing, and many venturi pipes arranged in parallel in the casing, and water jet nozzles at the both ends of the pipe bundle. Dust-containing gas flows into the casing and into the narrow part of the venturi pipes where the speed and pressure drop. Vapor condensation occurs and dust particles are covered by a thin liquid film. The turbulent air current created at the narrow throat and the difference in sizes and weight of the particles cause collision of dust particles and water drops, enlargine each particle. As they leave the venturi pipes, they are sprayed by the water jet and large dust particles drop down as sludge. Clean gas goes through a vapor separation apparatus and is discharged. This apparatus is particularly effective for collection of large quantities of small particles (down to 0.04 micron). The contact of the gas and jet liquid is great and uniform, and toxic gases such as sulfur dioxide and fluoride can be absorbed easily. The decrease in flow speed or quantity has no effect on the collection efficiency. The circulation of the jet water is easy, and the maintenance of the spray nozzle is easy because of the large opening. Wearing from friction is limited because of the slow speed of the gas.

33995

Shigara, Masao

COLLECTION AND ELIMINATION OF DUSTS. (Shujin and Jojin). Text in Japanese. Sangyo Kogai (Ind. Public Nuisance), 7(10):554-565, Oct. 1971. 7 refs.

Definitions of stack gas, dusts, particulates, emission sources, air quality standards, measuring methods of suspended particulates, effects of dusts on human health, emission standards, and various methods of dust collection are reviewed with references to laws and statistics. Dust collection devices include settling, momentum, centrifugal separation, scrubbing (pool, pressure, and wet cyclones), sound wave (condensation and particle growth), filter (surface and internal filtering), and electrostatic precipitator methods. Various filtering materials are reviewed with regards to temperature, acid resistance, alkali resistance, durability, hygroscopicity, and costs. Comparative efficiency and costs of various types of collectors are as follows: settling chambers are suitable for large particles of 50 to 1000 microns; the collection rates are 40 to 60% and the installation and operation costs are minimal. For medium size particles of 5 to 100 microns, cyclones show 85 to 95% efficiency and the cost is medium. For particles of sizes 0.1 to 100 micron, sound wave collectors yield a slightly better collection rate (80-95%) than venturi scrubbers and the cost of operation is also more advantageous. Bag filters collect 90 to 99% of 0.05 to 20 micron particles and both installation and operation costs are medium; 0.05 to 20 micron particles may be collected 80 to 99% by an electrostatic precipitator, which is costly to install, but the operational cost runs from minimum to medium.

34314

Iijima, Koichiro

HEAVY OIL HYDRODESULFURIZATION CATALYSTS AND THEIR REACTIONS. (Juyu suisoka datsuryu-ho no shokubai to hanno). Text in Japanese. Preprint, Japan Society of Chemical Engineering, Tokyo, p. 9-18, 1971. 21 refs. (Presented at the Dicussion on Desulfurization Techniques, 4th, Yokkaichi, Japan, Oct. 20, 1971.)

Difficulties in desulfurization are mainly found in the direct method, due to the difficulty of precipitation of vanadium and nickel between and within the catalyst particles, and the lowering of catalyst activity caused by asphaltene. Thy principles of desulfurization systems are explained with illustrations and operating variables of various types of systems; catalysts are reviewed. In the direct method of desulfurization, using a stabilized bed of cobalt molybdenum alumina (CoMo/Al203), the desulfurization rate drops drastically in the beginning; it continues to drop up to 50 hours, then stabilizes. Higher desulfurization rates are obtained with higher reaction pressures, or using one mm diameter spherical catalyst particles rather than two mm diameter particles, or thicker catalyst layers under a given condition. The ratio of desulfurization in one kind of heavy oil from the Middle East by the direct method showed elimination of 64% of vanadium, 68% of sulfur, 46% of nickel, and 49% asphaltene. The life and catalytic reaction of catalysts depends on types of oil for which they are used; but in general, efficiency can be improved by enlarging average pore sizes, improving the pore diameter distribution in relation to the macropore volumes, and increasing the surface area in relation to the volume of a catalyst.

34609

Sinyak, G. S., P. V. Lisovsky, G. I. Chizhikova, M. A. Vitashkina, E. I. Karpova, B. G. Gusarov, and L. L. Zablotsky

CATALYTIC OXIDATION OF GASEOUS PRODUCTS OF PYROLYSIS OF HUMAN WASTES. (Kataliticheskoye okisleniye nekotorykh gazoobraznykh produktov piroliza otkhodov zhiznedeyatel nosti Cheloveka). Text in Russian. Kosmich. Biol. Med., 5(5):77-80, 1971. 5 refs.

The applicability of catalysts -- hopcalite, copper-chromium, copper-cobalt, platinum and palladium -- to attain deep oxidation of the vapor-gaseous phase formed during the thermal treatment of human wastes was studied. Oxidizing properties of the catalysts were studied on individual gases -- methane, hydrogen, and carbon monoxide. When catalysts with higher activity were used to oxidize an actual gas mixture, the oxidation reaction of the gas mixture was completed at 350 deg only with the palladium catalyst. (Author abstract modified)

34683

Karl, Alfred

A WET GAS PURIFICATION PROCESS. (Verfahren zur nassen Gasreinigung). Text in German. (Heinrich Koppers G.m.B.H., Essen (West Germany)) Ger. Pat. 737,031. 2p., May 27, 1943. (Appl. March 30, 1940, 1 claim).

The process removes acid components like carbon dioxide, hydrogen sulfide, hydrocyanic acid, sulfur dioxide from waste gases. The gases are absorbed with aqueous solutions of organic compounds and removed from the washing liquid through distillation. The organic compounds in the washing liquid are derivatives of gamma-piperidon which contain an unchanged amino-and-keto-group like 2,2,6,6-tetramethyl-4-oxo-piperidine. In these compounds, the keto-group is in a para position to the amino-group. These compounds absorb inorganic acid compounds by forming loose bonds with them which are easily broken by reduced pressure, by an increase in temperature, or preferably by both simultaneously. Thus a separation of the absorbed acids is achieved without decomposition or condensation reactions of the gamma-piperidon in a solution which is returned to the process. Distillation is performed in a column at 60-80 C while scrubbing takes place at 20-30 C.

35015

Delannoy, Georges

ACTION OF THE FRENCH MINING INDUSTRY. (Action des Charbonnages de France). Text in French. Pollut. Atmos. (Paris), 23:22-26, Oct. 1971.

The French mining industry has participated in the fight against pollution in the mines themselves, in the processing of coal, and in its combustion. The necessary sampling and measuring devices were developed by the Centre d Etudes et Recherches des Charbonnages de France. In the mines, dust formation is controlled by the infusion of water under pressure into coal seams. During mining itself, water is sprinkled under pressure on coal banks that are being mined. Modern continuous methane monitoring equipment with alarm devices is also used. A difficult problem was coke oven pollution control involving dust and a tar aerosol. But the new oven charging techniques used in the Lorraine basin almost completely eliminated emissions. The French mining industry is characterized by a shortage of anthracite which alone burns without emitting coal tar. Therefore, smokeless coal is being produced by distillation or by oxidation on a large scale. The anthracite method alone yields 1,200,000 tons of smokeless coal a year. Smokeless coal has thus replaced the traditional coal briquettes which generated coal tar. Basic research currently being pursued bears on the formation of nitrogen oxides in furnaces, on the optimal physical and chemical conditions in waste incineration, on solids-gas interaction in combustion gases, and on the harmfulness of particulates and gases to human lungs.

35026

Suzuki, Shigeaki

DIRECT DESULFURIZATION TECHNIQUE AND APPARATUS. (Juyu datsuryu (chokusetsu datsuryu) gijutsu to sono sochi). Text in Japanese. Kankyo Sozo (Environ. Creation), 1(4):49-55, Nov. 1971. 4 refs.

The general principle of the direct desulfurization system, material oil for desulfurization, the nature of metal, hydrocarbons, and other elements in the material oil which impair the efficiency of desulfurization, various other operational problems, types of reaction towers, wear and corrosion problems, and economics are discussed. The elements which cause problems of desulfurization are vanadium, nickel, and close to 30 other metals of smaller amount. Ninety per cent of these metal compounds are concentrated in the oil residue to be desulfurized. These metals are extracted by catalysts which cannot be recovered once used. Asphaltene, an aromatic hydrocarbon and insoluble to propane and pentane, contains much more sulfur, nitrogen, and metal compared to solubles and presents a great problem. The amount of sulfur contained in asphaltene is approximately twice as much as the amount in raw oil. Asphaltene is not only difficult to desulfurize, but also impairs the catalytic action of other elements once it is adsorbed by the catalyst. According to the 1970 report of the General Energy Investigation Committee, the average sulfur content in the total fuel consumption in 1974 will be 0.95%, and in 1978, 0.55%. The sulfur content in the oil desulfurized by the indirect method presently under operation is 0.3 - 0.5%, and that of the oil desulfurized by the direct method is approximately 1.0%.

35060

PRESENT STATE AND FUTURE TREND OF RESIDUAL OIL DESULFURIZATION. (Juyu datsuryu no genjo to kongo no hoko). Text in Japanese. Kankyo Sozo (Environ. Creation), 1(4):43-48, Nov. 1971

By the end of 1970, 11 indirect desulfurization systems with a total capacity of 256,000 bbl/d were operating, and they are expected to increase to 15 systems, producing 39,500 bbl/d. Japanese oil import consists of 41% Iranian oil containing 2.5 to 2.6% sulfur in the heavy oil form, which can be reduced to 1.5 to 1.6% by an indirect desulfurization process. This compares with the Khafji oil, eight percent of the oil import, which contains 4.1% sulfur in heavy oil which can be reduced to 2.6% content. Three direct desulfurization systems presently operate in Japan, treating 112,760 bbl/d oil, and two more systems will be added in the next two years, increasing the capacity to 156,000 bbl/d. Of the stabilized bed operation and fluidized catalyst bed processing, the latter is more complex in mechanism, but the exchange of catalyst is possible without stopping the operation of the entire system. Also, maintenance of catalytic activity is easier, making a continuous operation for an extended time possible. It also desulfurizes residual oil with many metallic components which decreases the activity of catalysts and of decompressed distillation residual oil. Since this process is regarded most suitable for Japan which has to depend on various types of raw oil, The Ministry of International Trade and Industry has spent approximately $3,600,000 since 1967 on research and development of fluidized bed direct desulfurization technology. The goal is development of a desulfurization technique with a 70% result at the cost of approximately $3/k l. By the end of 1971, designing of actual plant and collection of basic data necessary for the construction and operation are to be completed.

35166

Yanagihara, Shigeru

AIR POLLUTION AND AUTOMOTIVE ENGINES (1). (Taiki osen to jidoshayo kikan (1). Kikai No Kenkyu (Science of Machine), 22(8):1101-1106, 1970. 4 refs. Translated from Japanese. Leo Kanner Assoc., Redwood City, Calif., 26p., Aug. 1971.

The effects of automotive exhaust emissions on air pollution are reviewed with respect to maximum allowable concentrations, environmental emission standards, regulation of engine exhausts, and various control methods. Automobiles emit carbon dioxide, carbon monoxide, hydrocarbons, soot and lead particulates, aldehydes, and odors as combustion gas from exhaust pipes, crankcase blowby gas, and fuel tank or carburetor vapors. Control methods included engine design modifications, improvements of the air inlet and ignition systems, air-fuel ratio, exhaust, air injection and fuel injection systems, and prevention of evaporation loss.

35496

Aizawa, Kiyoshi and Hirohide Iijima

FLUIDIZED BED INCINERATION SYSTEM. (Ryudosho shiki shokyaku sochi ni tsuite). Text in Japanese. Nenryo Oyobi Nensyo (Fuel and Combustion), 38(11):43-50, Nov. 1971.

In a fluidized bed combustion incinerator, a layer of heated and constantly moving particles such as sand acts as a combustion medium, and makes complete burning possible at the low temperature of 700 C. The solid waste comes in contact with the heated sand and organic material is completely decomposed and oxidized. The combustion gas goes through a heat exchanger before emission from the stack. Soot is further collected by either a multi-cyclone, a filter, or a wet-type dust collector. The smoke is made completely odorless by the complete combustion. Flow sheets and the design and operational specifications are presented.

35650

Viessman, Warren

CAUSE AND CONTROL OF ODOR IN AIR CONDITIONED SPACES. Air Cond., Heat., Ventil., vol. 56:77-81, Sept. 1959.

Obnoxious odors in enclosed spaces include tobacco smoke odors, chemical and product odors, odors introduced from the outside atmosphere, and odors from air conditioning coils. To keep odor perception and irritation at a minimum, air conditioning spaces should be designed for about 50-55% relative humidity. Temperature can generally be ignored since it has slight effect on odor level at constant specific humidity. Ventilation and charcoal adsorption are effectively and extensively used in air conditioning for odor removal by engineers. In ventilation, air containing objectionable gaseous odors, irritants, particulates that obscure vision, and toxic matter are replaced by clean fresh outside air. Ventilation requirements for human occupancy are a function of space person and the activity. An Activity Curve is given for determining the requirements for various conditions. At air temperatures below 125 deg, odors, vapors, and gases (except carbon monoxide or carbon dioxide) are effectively removed by charcoal adsportion. Carbon requirements can also be determined from the Activity Curve. Exhaust gases between 125-500 deg can be destroyed by catalytic combustion at 500 deg. For higher temperature gases, direct combustion at 1200 deg is employed. Tests were made on odor adsorption and release in an enclosed space. Methods for measuring odor intensities were discussed.

36151

Nagiev, A. M. and E. Sh. Allaverdyan

NEW ABSORBENTS AND CLASSIFICATION OF METHODS OF REMOVING SULPHUR DIOXIDE FROM INDUSTRIAL GASES. (Novye poglotiteli i klassifikatsiya sposobov ochistki promyshlennykh gasov ot dvuokisi sery). Izv. Vyssh. Ucheb. Zaved., Neft Gaz, no. 11-108-110, 1968. 12 refs. Translated from Russian. National Lending Library for Science and Technology, Yorkshire (England), 5p., 1968.

The ability of liquid petroleum products, including cracking kerosene, sulfide alkylphenol, naptha, alkylate, gas oil, and lubricant distillates, to absorb sulfur dioxide was experimentally confirmed. Determinations of combined sulfur and free SO2 contents of the absorbents showed that the petroleum products absorb SO2 as a result of chemical reaction between SO2 and hydrocarbon compounds. The liquid distillates had a greater absorbing capacity (96.1%) than the other petroleum products. The new absorbents are included in a classification of methods of absorbing SO2 from waste gas.

36204

Yanagihara, Shigeru

AIR POLLUTION AND AUTOMOTIVE ENGINES (2). (Taiki osen to jidoshayo kikan (2)). Kikai no Kenkyu (Science of Machine), 22(9):29-32, 1970. 3 refs. Translated from Japanese. Leo Kanner Assoc., Redwood City, Calif., 16p., Aug. 1971.

Measures for reducing exhaust emissions from internal combustion engines are discussed with special reference to nitric oxide. A substantial reduction in NO appears possible by combining exhaust gas recycling with a high-temperature exhaust reactor for the oxidation of hydrocarbons and carbon monoxide. A two-stage catalytic muffler also promises to purify exhaust gas without adversely affecting engine performance. The NO is reduced by a catalyst in the first stage, after which air is admitted and the hydrocarbons and CO are oxidized. It will be difficult to lower NO levels below one gram/mile in engines other than gasoline engines. In Sterling engines, far-reaching recycling is required, and even in steam engines combustion gas temperature must be 1000 C or below. Electric engines are exhaust-free but the lead used in present batteries may exceed the amount in gasoline additives. If it is necessary to limit NO to less than five grams of nitrogen dioxide/one kilogram of fuel, the same standards should be applied to boilers and other combustion devices.

36413

Hasenclever, D.

THE USE OF RADIOACTIVE INDICATOR SUBSTANCES FOR SOLVING DUST PROBLEMS. (Die Verwendung von radioaktiven Indikatorstoffen zur Loesung von Staubfragen.) Staub (Duesseldorf), 16(44): 159-173, 1956. 6 refs. Translated from German by William H. Everhardy, National Institutes of Health, Bethesda, Md., Translating Unit, 25p., July 30, 1958.

A method which makes it possible to tag and characterize very fine particles of suspended matter by apposition of the atomic secondary products of a radioactive gas was described. The experimental procedure for radioactive filter testing were also described and the results obtained were compared with those obtained in the testing of a mixture of quartz dust and air. New formulas are given for the calculation of the radioactive degree of removal; with these, the measurement of crude and pure air in the experimental procedure can be avoided. Autoradiographs of different filter materials give information concerning the structure and composition of the filters. Autoradiographs of thermal-precipitator samples were taken from a mixture of the thorium emanation. They show that the thermal precipitator removes 100% of the radioactively tagged particles of suspended matter, that the precipitation begins in front of the heated filament, and by comparison with microscopic examinations in the bright and dark field, that the maximum granule size of the particles must be less than 0.2 micron. The konimeter is capable of holding back a considerable part of this suspended matter. (Author summary modified)

36460

Witte, Erich

HOW FAR ADVANCED ARE NEW ENERGY SOURCES FOR ELECTRICAL TRUCKS? Foerdern Heben, 19(5):295-297, 1969. 7 refs. Translated from German, 7p.

The current status of accumulators and fuel cells for electric vehicles is reviewed. Most accumulators under development are unsuitable because they contain expensive materials whose quantities are limited. Except for the heavy lead accumulator, there remain only the air-zinc accumulator and the sodium sulfide accumulator. Several years of testing have resulted in no practical application of the latter. Although their primary cells have been manufactured for decades, two essential problems exist with air-zinc accumulators: development of a suitable electrode for air intake and the dissolution of the zinc electrode during discharging. It is doubtful that the air-zinc accumulator will replace the lead accumulator on electric trucks. Work on mechanically rechargeable fuel cells is still in the initial stage.

36951

VDI Verein Deutscher Ingenieure Kommission Reinhaltung der Luft, Duesseldorf (West Germany), Fachausschuss Aufbereitungs und Mischanlagen fuer den Bituminoesen Strassenbau

RESTRICTION OF EMISSION. PRETREATMENT AND MIXING PLANTS FOR ROAD-SURFACING AGGREGATES WITH BITUMINOUS BINDER. VDI (Ver. Deut Ingr.) Richtlinien, no. 2283, July 1967. 16 refs. Translated from German. Israel Program for Scientific Translations, Jerusalem, 9p., June, 1970. NTIS: TT 68-50469/16

The surfacing of asphalt roads requires a mixture produced from a mineral aggregate and a bituminous binder. The mineral aggregate may be natural rock material (sand or gravel), crushed rock (rock fines, grit, road metal), crushed blast furnace slags, or rock dust (as filler). In order to obtain the desired grain-size composition, the mineral aggregates are mixed in a certain proportion, for which standards and codes of practice exist. Plant operation includes batching of the input aggregates, drying and heating, mixing, haulage and loading, storage, preheating of rock dust, and treatment of binder. Sources of dust formation are indicated, as well as the type of dust formed and means of reducing dust concentrations. Mechanical collectors, wet collectors, filters, and electrostatic precipitators are evaluated for this application. The release and prevention of gases, vapors, and odors are also discussed.

37115

Kholin, B. G., L. M. Chernyak, and S. A. Kolesnikov

TEST OF FAN ATOMIZER FOR ABSORPTION OF FLUORINE-CONTAINING GASES IN THE PRODUCTION OF SUPERPHOSPHATE. Sov. Chem. Ind. (English translation from Russian of: Khim. Prom.), no. 4:286-287, April 1971. 13 refs.

Fine-dispersion atomization of the liquid is one of the most powerful means of intensifying mass-transfer processes between a liquid and gas. The intensity of the absorption process with fine atomization can be increased by using rotating perforated cans, particularly with outflow openings of relatively large diameter. This makes it possible to create a reliable, highly productive, and economic design for a fan liquid atomizer which then can be used to absorb fluorine-containing gases in the production of superphosphate.

37252

Siewert, Robert M.

CHANGES IN VALVE TIMING CAN REDUCE EXHAUST EMISSIONS. SAE (Soc. Automot. Engrs.) J., 79(6):40-44, June 1971.

Advancing the intake valve opening or the exhaust valve closing time significantly reduced hydrocarbon and nitrogen oxide emissions from a modified V-8 engine under part-load, low-speed test conditions. Advancing the intake valve opening to 45 deg btdc reduced hydrocarbon emissions by 25% and nitric oxide emissions by 38%. Hydrocarbon emission decreased 25% when the exhaust valve closing was advanced to 22 deg btdc. Delaying the closing to 65 deg btdc resulted in an 18% decrease in hydrocarbons. Nitric oxide emissions decreased 45% at the maximum exhaust valve closing advance and 50% at the full exhaust valve closing retard. The valve timing changes appeared to reduce nitrogen oxide emissions by increasing internal recirculation. Increases in internal recirculation may reduce hydrocarbon emissions by selective retention of hydrocarbon-rich quench gases.

37324

Dobrayakov, G. G., M. Z. Serebryakov, and V. P. Rychkov

OPERATION OF A GAS-CLEANING SYSTEM ON A CLOSED-TOP ELECTRIC FURNACE. Steel (USSR) (English translation from Russian of: Stal), 1(5):401-402, May 1971.

A ferroalloy work was provided with closed-top electric furnaces for making 45% ferrosilicon, which were successfully fitted with wet gas cleaners consisting of an inclined connecting duct, a scrubber, an atomizing pipe, and a blower. The gas to be cleaned arrives at the rate of 1700-2200 cu m/hr, the dust loading on leaving the furnace is 10-55 g/cu m. With better spraying of the inclined gas duct, the scrubber can be eliminated. (Author abstract modified)

37448

Puhr-Westerheide, Hans

DEVELOPMENTS FOR MORE ECONOMIC POWER PRODUCTION FROM COAL. (Entwicklungen fuer eine wirtschaftlichere Energieerzeugung aus Kohle). Text in German. Glueckauf (Essen), 108(2):73-75, Jan. 20, 1972.

Two new methods for power production based on coal are discussed: the fluid-bed method, and the coal-pressure-gasification method. Both methods have advantages over conventional power plants as far as desulfurization of wast gases is concerned. In conventional power plants, desulfurization of flue gases prior to discharge into the atmosphere is feasible only at great expense. Simpler solutions are available for the two new methods. In the fluid-bed method, ground limestone is added to the fluid bed. The sulfur is bound in the fluid bed and the loaded additive is discharged with the ash. It is expected that a degree of desulfurization of up to 90% can be achieved with this method. In coal-pressure gasification, the hydrogen sulfide can be removed from the gas prior to combustion. Laboratory experiments have shown that the hot-potash-method is very suitable for this purpose. The pressurized gas is passed through a cooler-saturizer system. Preliminary scrubbing of the gas is carried out in the cooler, the actual desulfurization then takes place in the absorber containing a potash solution. In the saturizer, the gas is heated again countercurrently to 150 C. Elemental sulfur is produced from the absorbed gas in a Claus furnace. A degree of desulfurization of 90% is feasible. An experimental plant for desulfurization of 3500 cu m/hr will be erected in the power plant Kellermann. The waste gases from the combined desulfurization/pressure gasification process are entirely dust free.

37544

Burkat, V. S., E. Ya. Tarat, V. A. Baevshii, E. M. Voronin, and M. T. Tsurenko

PURIFICATION OF ALUMINUM-INDUSTRY GASES IN A HOLLOW HIGH-SPEED SCRUBBER. Soviet J. Non-Ferrous Metals (English translation from Russian of: Tsvetn. Metal.), 10(9):61-63, Sept. 1969. 3 refs.

A pilot gas purifier consisting of an electric separator and a hollow scrubber with spray nozzles was tested for its ability to remove gaseous and solid fluoride compounds from exhaust gases at an aluminum plant. The efficiency of gas purification in the scrubber was determined at gas linear velocities of 3-7 m/sec, gas inlet temperatures of 40-50 C, and spraying densities of 20 and 30 cu m/sq m/hr. Spray density had a greater influence on the degree of hydrogen fluoride entrainment than a change in gas velocity. The degree of purification remained constant within the gas-velocity range tested, but increased with an increase in spraying density. An equation is given that predicts the performance of the hollow, high-speed scrubber under various operating conditions.

37553

Rikhter, L. A., I. B. Zasedatelev, and F. P. Duzhikh

INCREASING THE RELIABILITY OF LARGE THERMAL POWER STATION CHIMNEYS. Thermal Eng. (English translation from Russian of: Teploenergetika), 18(3):103-106, March 1971. 4 refs.

Corrosion problems associated with four types of single-flue chimneys installed at large Soviet thermal power stations are discussed. The chimney types are reinforced concrete with ceramic linings (I); metal chimneys made of individual thermally insulated sheet-steel cylinders (II); reinforced concrete with metal flues for thermal insulation (III); and reinforced concrete with ventilated clearance between the flue and the lining (IV). The best results were obtained with type IV provided the ventilation was forced and a static pressure existed in the clearance. Under these conditions, there is no gas flow toward the supporting reinforced concrete shaft and thus no corrosion of the later. However, the requirement of a minimum of two fans with electrical drives and a reserve power supply make type IV chimneys with forced ventilation more expensive. As a solution, a new type of reinforced concrete chimney is proposed, one that is pressurized in a naturally ventilated clearance of variable width between the reinforced concrete shaft and an acid-resistant lining. The new design should increase the reliability of chimneys for high-capacity thermal power plants.

37709

Brauer, H. and D. Mewes

LAWS GOVERNING THE FLOW AS WELL AS THE SUBSTANCE AND HEAT TRANSFER IN MULTI-STAGE TURBULENT SPRAY TOWERS. (Gesetzmaessigkeiten fuer Stroemung sowie Stoff- und Waermeuebergang in mehrstufigen Rieselboden-Wirbelschichten). Text in German. Chem. Ing. Tech., 44(5):357-360, March 1972. 9 refs.

Each stage of a multi-stage turbulent spray tower consists of a perforated plate above which is the turbulent layer. The holes in the perforated plate are so small that the fluid may pass through but the solid particles may not. Fluid and particles pass countercurrently through the tower. On each stage solids and fluid are mixed intensely and separated again. For calculation of the multi-stage spray tower the pressure loss, the particle concentration on each stage, the average residence time, the residence time distribution, and the particle throughput must be known. The mathematical determination of each parameter is discussed. Of all contributions to the total pressure, only the pressure loss of the fluid at the transit through the turbulent particle mass and the pressure loss across the perforated plates is of significance. Analytical expressions for the two quantities are given, as well as the other parameters mentioned above. A Fortran program has been written for the calculation of the fluid dynamic properties of multi-stage spray towers together with detailed instructions for feeding the program into a computer.

38190

Zimmermann, Lothar and Peter Fleischhauer

STABILIZATION OF THE SEPARATING CONDITIONS OF ELECTRIC SEPARATORS BEHIND CEMENT MILLS BY WATER SPRAY NOZZLE. (Stabilisierung der Abscheideverhaeltnisse an Elektroabscheidern hinter Zementmuehlen durch Wassereinduesung). Text in German. Silikat. Tech., 22(12):407-409, Dec. 1971. 3 refs.

The installation of electric separators at high-output cement mills is recommended as an economical approach to keeping dust emissions within the limits permitted by law. A prerequisite for stable and effective operation of filters is the installation of a water spray nozzle in the third chamber of the mill. The construction and operation of the nozzle and results obtained with such a nozzle are illustrated by an example. The results justify the recommendation.

C. MEASUREMENT METHODS

01534

H. Wozniczek

AIR POLLUTION BY MOTOR CAR EXHAUST GASES) ZATRUCIE Powietrza Przez Spaling Samochodowe. Ochrona Pracy (Warsaw), 21(5):14-17, May 1966.

Pollution of towns and cities by automotive emissions is described. Chemical analyses of the various constituents of exhaust gases are given. Toxicity of these constituents is discussed.

01541

P.I. Chalov M.A. Tsevelev

ON THE WASHOUT OF RADIOACTIVE AEROSOLS BY ATMOSPHERIC PRECIPITATION IN THE SUB-CLOUD LAYER. Atmos. Oceanic Phys. 2(2):121-123, Feb. 1966.

Results of experiments concerned with washout of fission fragments by atmospheric precipitation in the subcloud layer of the troposphere are presented. Rain water was collected in sampling tanks at three different elevations on a mountain slope. The rainwater was evaporated and the beta-radioactivity of the residue was measured. Fallout density increased as the sampling point was lowered, indicating that fission fragments are washed out by the precipitation. The amount of increased radiation showed considerable variation.

05439

METHODS OF MEASURING AIR POLLUTION (PART 6). Metodi di Misura dell' inquinamento Atmosferico (Sesta Parte. Fumi Polveri (Milan) 1(7):18-24, Jan. 1967. It.

Two methods for measuring minute quantities of fluorine in the atmosphere are described. 1) Two methods are given for measuring a sample with an impinger. In the photometric method air is introduced in the appratus containing a normalized solution of 0.1 N NaOH which absorbs the fluorine ions. The ions are then separated in the vapor state and the amount of fluorine determined photometrically. The sensitivity of this method is 3 micrograms F/cu m of air when measured directly, and 0.6 microgram F/cu m when preliminary concentration measurements are made. The metric titration method, less sensitive than the photometric (10 micrograms F/cu m, is used for high fluorine concentrations. Equations are given for both photometric and titration methods from which the concentration of fluorine can be calculated. 2) In micro-diffusion methods, air is passed across a bottle containing gas and pieces of plexiglass on which compounds containing fluorine are absorbed in 0.1 N NaOH. Extraneous substances are eliminated by micro-diffusion and the amount of fluorine is determined photometrically.

06112

Tada, O.

MEASUREMENT OF AIR POLLUTANTS. Bunseki Kagaku (Japan Analyst) (Tokyo) pp. 110R-7R. 1966. Jap.

Important papers published in Japan Analyst in 1964 and 1965 are summarized. The subject is limited to measurement methods of air pollutants known to be toxic to health. Pollutants from stacks and automobile exhausts are covered, including many cyclic hydrocarbons, aldehydes, sulfur oxides, nitrogen oxides, ozone, carbon monoxide, carbon dioxide, fluorine compounds, hydrogen sulfide, lead compounds, and offensive odors. Various sampling methods are described, especially using filtering with glass wool filters, electric dust collectors, gas absorbers, and portable samplers containing silica gel. The pollutants can be measured by electroconductivity methods, colorimetric measurement recorder, gas chromatographic analysis, electron capturing detector, and hydrogen ion detector. The papers summarized do not include those dealing with industrial or occupational environment or mining.

07180

W. Breuer

METROLOGY AND AIR POLLUTION. Die Messtechnik bei der Reinhaltung der Luft. VDI (Ver. Deut. Ingr.) Z. (Duesseldorf) 107 (30), 1434-8 (Oct. 1965). Ger.

A survey of air pollution measurements is presented. In the group of emission measurements, a block diagram for continuous CO2 and SO2 measurements is given and some details of sampling and filtering are discussed. A nomograph relates the SO2 emission with the sulfur concentration of the fuel. These measurements operate on the principle of infrared absorption. Another block diagram shows examples of dust measurements. Both the electrostatically operating 'Konitest' and a meter based on light extinction are employed. An electrochemical device determining chlorine is explained. Here the chlorine oxidizes iodide which in turn causes a depolarization current to flow. As an example of concentration measurements, an electrochemical device determining H2S in concentrations as low as 1 ppb is given. The electric current arising as the result of the formation of silver sulfide is of the order of 0.1 micron amp which can be amplified and recorded. A short discussion of practical aspects of sampling and statistical evaluations of results, in particular, relations to wind directions, concludes this paper.

07391

H. Miyazaki, K. Ui, H. Ando

INVESTIGATION OF TEXT METHODS OF S-OXIDES AND N-OXIDES IN THE ATMOSPHERE. Text in Japanese. J. Japan Petrol. Inst. (Tokyo), 9(3):214-216, Mar. 1966. 10 refs.

The methods investigated are the electrical conductivity method, rosaniline method, and Saltzman method. Drawbacks to the electrical conductivity method are that SO2 and SO3 cannot be measured separately and that H2S, mercaptans, and other elements interfere with measurement. In addition, the electrical conductivity of the absorbing liquid depends on the temperature. The rosaniline method is used only for SO2. Considerations in using this method consist of the speed of absorption of the air tested, the shape of the absorber, absorption efficiency, and maintenance of the absorption liquid. Impingers and air washing bottles are also required. The absorption of test air depends on the celocity and on the shape of the bottle; absorption efficiency of the absorption liquid was good, indicating the need for only one absorption tube. Data obtained by sue of both electrical conductivity and rosaniline methods were in good agreement with each other. As for the Saltzman method for N-oxides, the absorption efficiency was found to depend on the speed of absorption and on the type of absorption tube used. It is difficult to make a perfect collection of NO2 by the Saltzman method. The hourly variation of NO2 concentration in Yokohama is graphed; it reached a peak of 0.05 ppm between 9 and 10 A.M. which is much less than the corresponding SO2 concentration.

07401

Suzuki, S.

POTENTIAL AUTOMATIC DETECTOR OF SMALL AMOUNTS OF OXIDIZING GAS USING POTASSIUM IODIDE AS A REACTION INDICATOR (I). Text in Japanese. Kuki Seijo (Clean Air-J. Japan Air Cleaning Assoc., Tokyo), 2(3):19-29, 1965. 7 refs.

The detector described consists of two parts: the measuring section and the recording part. The efficiency of the measuring part was determined by a potentiometer which measured the relation between the iodine concentration and electric potential which are proportional. There was difficulty in obtaining good repeatability values; the problem is discussed in some detail. The efficiency of the automatic recording equipment was then tested. A wiring diagram of the apparatus is included. The relation between resistance change in the wire and deflection of the recorder is graphed. As for operating procedure, the effects of potential stability, bubbling, and ultraviolet rays were investigated. Graphs illustrate that initial potential stability in potassium iodide is difficult to reach but once obtained, the stability will remain constant during changes in potassium iodide. Other effects noted were that bubbling affects the voltage and the effect of ultraviolet rays is great. The detector was used for NO2, ozone, radioactive iodine, and other gases. The process and methods of examination are described in detail.

07482

Kanno, S.

DETERMINATION OF GASEOUS AIR POLLUTANTS. Text in Japanese. J. Jap. Petrol. Inst. (Tokyo), 7(2):92-96, Feb. 1964. 6 refs.

The determination of sulfur oxides and nitrogen oxides in smoke and in air are covered. SO2 in smoke is measured colorimetrically or by detection tube. Two methods are described: one for measuring pollutants after the combustion of coal or heavy oil or for gases mixed with NO2 and the other for mixtures of SO2 and SO3. Procedures are given for making the test liquid (absorption liquid) and for exact measurement for each method. The detection tube is illustrated briefly. The absorption tube method is not sufficient for NO2 detection. A method of almost perfect collecting efficiency which is used in the Kanagawa Prefecture Public Health Laboratories is described. The absorber is composed of a mixture of NaOH and butanol. For SO2 and SO3 measurement, the electric conductivity method and barium molybdate method are illustrated. The rosanaline method is used as well as an alkali filter paper method. The latter is superior to the widely used PbO2 method in that reagent quality does not affect the measured value and the collecting efficiency does not depend on temperature and humidity.

07721

Uzima, M.

SIMPLIFIED METHOD OF MEASUREMENT OF QUANTITY OF SOOT & DUST, AND ITS RELATIONS OF ((SIC)) SMOKE CHART. Text in Japan- ese. Netsu Kanri (Heat Engineering) (Tokyo), 19(1):11-16, Jan 1967.

The East-North Power Station together with the Central Electric Power Institution studies a simpler method to standardize dust and soot-measuring methods. They tried to find the point which gives the average amount of soot and dust without measuring the distribution of concentration. They also investigated the possibility of measuring the amount of soot and dust in grams/cubic meter using a soot and smoke meter of the photoelectric type. In this experiment, the temperature distribution, velocity distribution, and soot and dust concentration at the cross-section of the smoke duct were measured. Measurements were also made at the inlet and outlet of the dust collection device. For measuring concentration, at the inlet, the constant-velocity suction tube method was used, a dust tube alone was used when heavy oil was the fuel, and at the outlet, both tubes were used. When coal was used as fuel, the size of the dust particles was 30 to 40 microns at the inlet and 5 to 7 microns at the outlet. It was found that the curves of the velocity of the gas and of the soot and dust concentration were almost the same indicating that the average amount of soot and dust could be measured at the point where the velocity of the gas was average. Measurement of the distribution of soot and dust is only required for determining dust collecting efficiency.

08121

Vronskiy, A. I., and Latushkina, V. B.

METHODS OF DETERMINATION OF THE DEGREES OF CONTAMINATION OF AIR WITH DUST USING AEROSOL ANALYTICAL FILTERS (AAF). In: A. A. Letavet and Ye. V. Khukhrina (eds.), Methods of Studying Industrial Dust and the Incidence of Pneumoconioses. ((Metody izucheniya proizvodstvennoy pyli i zabolevayemosti pnevmokoniozami.)) Leningrad, Meditsina Publishing House, 1965, 123p. Translated from Russian. Clearinghouse for Federal Scientific and Technical Information, Washington, D. C., Joint Publications Research Service, TT 66-30952, p. 9-17, March 11, 1966. 3 refs.

A method for the determination of dust content in air by weight is described. The method utilizes fabric filters and enables one to determine the dynamics of dust formation during various industrial processes in short periods of time, and to evaluate the effectiveness of dust-prevention measures. Long experience in the use of AAF-W filters in the laborator, as well as in mines and various industrial enterprises brought out the following advantages over other filtering materials: 1) high efficiency of dust retention in the linear filtration rates of up to 100-150 cm/sec; 2) the flow of air passing through the filter can be brought up to 100 liters/min.; 3) the low aerodynamic resistance makes it possible to increase the rate of sample taking, and in this way decrease the sampling time; 4) as a rule, the filters are weighed without preliminary drying; 5) the low weight of the filter (25-30 mg) makes it possible to determine the minimum weight of dust of 1 mg; 6) reduction of the time required for the entire analysis makes it possible to obtain results of the determination of the dust content of air practically on the same day on which the samples were taken. In actual practice AAF-W-10 and AAF-W-18 filters are used for determining the dust content by weight. Here the code letter W signifies weight and 10 the diameter of the working surface of the filter in sq cm. The principle of determination of the amount of dust expressed in mg/cu meter, using FPP-15 cloth filters consists of drawing a specific volume of dust-laden air through the filters with subsequent determination of the gain in weight and calculation of the dust concentration in units of weight per unit of volume of air.

08122

I. A. Kovalevich

INVESTIGATION OF THE DUST CONTENT OF AIR BY THE ULTRAMICROSCOPY METHOD. In: A. A. Letabet and Ye. V. Khukhrina (eds.), Methods of Studying Industrial Dust and the Incidence of Pneumoconioses. ((Metody izucheniya proizvodstvennoy pyli i zabolevayemosti pnevmokoniozami.)) Leningrad, Meditsina Publishing House, 1965, 123p. Translated from Russian. Clearinghouse for Federal Scientific and Technical Information, Washington, D. C., Joint Publications Research Service, TT 66-30952, p. 18-22, March 11, 1966. 6 refs.

The ultramicroscopic method for the determination of the number of dust particles contained in one unit of volume of air is described. In ultramicroscopy the dust particles are seen against a dark background in the form of luminous points. The method makes it possible to determine dust particles of microscopic and submicroscopic (to 0.04 micron) - ultramicroscopic size. The investigation of the dust content of air by this method can be performed either under industrial or laboratory conditions. This method enables one to determine rapidly (in 5-10 minutes) the concentration of particles in a moving stream of the investigated air, and in the investigation, the dispersed phase is not separated from the dispersion medium, there is no phase is not separated from the dispersion medium, there is no conglomeration and, conversely, no breaking up of the dust particles or changing of their number. The instruments used in ultramicroscopy of aerosols are divided into two types: 1) instruments with which the particle count is performed in isolated volumes of an arrested air flow, and 2) instruments with which the particle count is performed in a continuously moving air flow. The disadvantage of all these instruments lies in the possibility of settling of particles on the walls of the rubber tubes, and in the instruments of the first type also in the chamber (cell), in which the particles are counted. The main parts of the instruments are the cell, the light source, and the microscope. The individual design features of the instruments pertain to the arrangement of the lighting and optical systems. The use of this apparatus for dust content determination by the counting method either under laboratory or industrial conditions (in plants, shafts, or mines) proved that it yields good results. A wider use of this method in the practice of hygienic investigations is recommended.

08123

A. I. Vronskiy, A. S. Slutsker, Y. V. Khukhrina

COMPARATIVE EVALUATION OF NEW METHODS OF DETERMINATION OF THE DUST CONTENT OF AIR. In: A. A. Letavet and Ye. V. Khukhrina (eds.), Methods of Studying Industrial Dust and the Incidence of Pneumoconioses. (Metody izucheniya proizvodstvennoy pyli i zabolevayemosti pnevmokoniozami.) Leningrad, Meditsina Publishing House, 1965, 123p. Translated from Russian. Clearinghouse for Federal Scientific and Technical Information, Washington, D. C., Joint Publications Research Service TT 66-30952, p. 22-32, March 11, 1966. 2 refs.

Comparative tests of gravimetric and counting apparatuses for the determination of the dust content of air are discussed. The procedure with the use of AAF-W-10 filters is recommended instead of GOST-50, as the most progressive and reliable one; the equipment for the gravimetric determination of the dust content of air is recommended for adoption in research work. The gravimetric method must be retained in the future as the basic one, and at the same time work must be continued on its further improvement, in particular, its automation. 3) Along with the gravimetric method, in the practice of the work of institutes it is expedient to use in a parallel a counting method. Among the counting apparatuses, the most reliable data are given by VDK-4 apparatus, which however, must be further improved. The field aerosol counter for the determination of the concentration by count in the flow is recommended for use in the practice of hygiene research. The use of instruments for the determination of the concentration by count in arrested flow is not recommended. It is necessary to continue the work on the improvement of the counting methods for determining the dust content in air, along the line of automation of the particle count of dust and determination of its size distribution.

08124

Y. Shimechek, V. V. Tkachev, A. M. Shevchenko

COMPARATIVE EVALUATION OF TWO GRAVIMETRIC METHODS OF DETERMINATION OF DUST CONCENTRATION IN MINE AIR. In: A. A. Letavet and Ye. V. Khukhrina (eds.), Methods of Studying Industrial Dust and the Incidence of Pneumoconioses. (Metody izucheniya proizvodstvennoy pyli i zabolevayemosti pnevmoko niozami.)) Leningrad, Meditsina Publishing House, 1965, 123p. Translated from Russian. Clearinghouse For Federal Scientific and Technical Information, Washington, D. C., Joint Publications Research Service, TT 66-30952, p. 33-38, March 11, 1966.

A fabric filter method was compared with the Czechoslovakian membrane filter method. Comparison was made under the conditions of the mining industry during the hygienic evaluation of drilling of rising blast holes in soft rock. All the operations were performed under the same conditions, at the same work locations, and with practically unchanged ventilation. The statistical processing of the results established that the difference in the mean dust concentrations is not authentic, i.e. both filters produced the same results. Both methods can be assumed to be of equal value, which fact enables one to compare the results of investigations performed in the USSR, Czechoslovakia, and other countries which use these methods. It must be noted that FPP fabric filters have certain advantages, because they have less resistance and, moreover they do not require drying to constant weight owing to their hydrophobic nature. At the same time one must note the distinctive feature of the Czechoslovakian apparatus, which has special deivies for assuring the constant rate of air-sample taking. This apparatus can be successfully used with FPP fabric filters.

08125

T. T. Lobova

STUDY OF THE PARTICLE SIZE DISTRIBUTION OF DUST BY THE MICROSCOPY METHOD. In: A. A. Letavet and Ye. V. Khukhrina (eds.), Methods of Studying Industrial Dust and the Incidence of Pneumoconioses. (Metody izucheniya proizvodstvennoy pyli i zabolevayemosti pnevmokoniozami.) Leningrad, Meditsina Publishing House, 1965, 123p. Translated from Russian. Clearinghouse for Federal Scientific and Technical Information, Washington, D. C., Joint Publications Research Service, TT 66-30952, p. 39-43, March 11, 1966.

The degree of dispersion of dust, determined by the microscopic observation of dust particles, is expressed in per cent of the number of dust particles of various sizes with respect to the total number of the particles measured. The study of the particle size distribution of dust is composed of the following operations: preparing the mount, calibrating the micrometer, measuring and counting the dust particles of specific fractions, and calculation of the particle size distribution. The dust specimen mounts are usually prepared directly at the production site, at the sample-taking location, i. e. in the breathing zone of the workers, as well as next to the dust producing spot, near the ventilation devices, in the air ducts, at the ventilation air exhausts, depending on the aims and tasks of the investigation. The basic disadvantages of the method of studying the particle size distribution by means of a micrsocope are connected primarily with the possibility of not obtaining satisfactory dust mounts, with not accurate calibration of the sizes of eye-piece micrometers, and finally, with the sensitivity and the susceptibility to fatigue of the eye in microscopic work, along with the exceptionally large amount of work involved. The main, most important disadvantage of the method in principle, is the feasibility to determine with its aid of the particle size distribution only according to the number of particles, whereas for the hygienic estimate it is important to know the mass of the dust of various particle size.

08126

Vronskiy, A. I.

APPARATUS FOR THE MICROSEDIMENTATION ANALYSIS OF PARTICLE SIZE DISTRIBUTION OF DUST. In: A. A. Letavet and Ye. V. Khukhrina (eds.), Methods of Studying Industrial Dust and the Incidence of Pneumoconioses. ((Metody izucheniya proizvodstvennoy pyli i zabolevayemosti pnevmokoniozami.)) Leningrad, Meditsina Publishing House, 1965, 123p. Translated from Russian. Clearinghouse for Federal Scientific and Technical Information, Washington, D. C. Joint Publications Research Service, TT 66-30952, p. 43-48, March 11, 1966. 5 refs.

An apparatus was developed in order to be able to use dilute suspensions and take small specimens of dust. As a balance a sensitive quartz spiral stretching 3 to 6 mm/mg was used. Components of the apparatus are: thermostat, consisting of stirrer, contact and control thermometer and electronic relay. The thermostat container is made of plexiglass. The apparatus was tested in the laboratory with a number of powdered materials (quartz, coal dust, granite dust, etc.) In the analysis of the sedimentation curves obtained the analytical calculation method was used. The results of the determination were satisfactory.

08127

Kireyev, V. I.

METHODS OF DETERMINATION OF FREE SILICON DIOXIDE IN DUST. In: A.A. Letavet and Ye. V. Khukhrina (eds.), Methods of Studying Industrial Dust and the Incidence of Pneumoconioses. (Metody izucheniya proizvodstvennoy pyli i zabolevayemosti pnevmokoniozami.) Leningrad, Meditsina Publishing House, 1965, 123p. Translated from Russian. Clearinghouse for Federal Scientific and Technical Information, Washington, D. C., Joint Publications Research Service, TT 66-30952, P. 52-60, March 11, 1966. 4 refs.

The method of determination of free silicon dioxide in the presence of silicates is based on the fact that pyrophosphoric acid dissolves the silicates and has practically no effect on quartz. The quartz content in the undissolved dust is determined by the gravimetric method after treating it with hydrofluoric acid in the presence of sulfuric acid, or by the colorimetric method with the reduced silicomolybdate complex. The senditivity of the method is 2 micrograms SiO2 in the analyzed volume of the solution. Under the above conditions phosphorus, arsenic, and iron do not inter- fere. Another method is based on the selective destruction of free SiO2 through fusing it with a special 'composite' flux, extraction from the cake of the alkaline metal silicate obtained, and colorimetric determination of it according to its yellow silicomolybdate complex. Reagents, equipment and calculations are included.

08128

Tyutin, P. I.

THE COUNTING-COLOR METHOD OF DETERMINATION OF THE MINERAL COMPOSITION OF DUST. In: A. A. Letavet and Ye. V. Khukhrina (eds.) , Methods of Studying Industrial Dust and the Incidence of Pneumoconioses. ((Metody izucheniya proizvodstvennoy pyli i zabolevayemosti pnevmokoniozami.)) Leningrad, Meditsina Publishing House, 1965, 123 p. Translated from Russian. Clearinghouse for Federal Scientific and Technical Information, Washington, D. C., Joint Publication Research Service, TT 66-30952, p. 60-66, March 11, 1966. 4 refs.

Etching minerals of various composition with acid forms on their surface an amorphous corrosion film, which is stained with methylene blue into different colors, depending on its chemical composition. The method can be used not only for determining various minerals, but also for the study of the quantitative composition of rocks after they are ground to powder. For this purpose the rock is crushed in a cast-iron mortar and its powder is screened through 250 and 325 mesh sieves. The analysis is performed on the plus 325 mesh fraction, which was established experimentally as approximately corresponding to the mean composition of the rock investigated. For the analysis 0.5-1.0 g of powder is taken and placed in a porcelain dish and covered with 5 percent hydrofluoric acid. During the five-minute etching the material is stirred several times. After etching, the acid is decanted off and the powder, without being rinsed with water, is covered with a 0.025 percent solution of methylene blue basic). The staining continues 5-7 minutes with constant stirring of the suspension. Upon the elapsing of the above period the dye is poured off, the powder is rinsed with water (1-2 times) and dried in the same dish. The stained powder mount is then prepared and viewed under the microscope with regular or polarized light.

08465

Leithe, Wolfgang and Gunther Petschl

DETERMINATION OF AMMONIA IN AIR BY THE INDOPHENOL REACTION. ((Bestimmung von Ammoniak in Luft uber die Indophenolreaktion.)) Text in German. Anal. Chem. (Berlin), 230(5):344-347, Aug. 1967. 4 refs.

A procedure is proposed for the determination of low concentrations of ammonia in air by the indophenol reaction with sodium phenolate and sodium hypochlorite. The limit of detection (1 micro g NH3 at 99% confidence limit) and the precision (standard deviation plus or minus 2 to 4%) are equal to the Nessler reaction. However, with the present procedure there is no interference by moderate amounts of hydrogen sulfide; therefore prior isolation of the ammonia by steam distillation usually can be omitted. Hydrogen sulfide under 60 micro g does not interfere with the determination of 5- 50 micro g of ammonia. If larger amounts of hydrogen sulfide are present, the acidic solution is boiled for five minutes until the odor of hydrogen sulfide disappears. Nitrite and sulfite up to 1 mg do not interfere. The presence of formaldehyde does interfere and requires distillative purification of the ammonia solution.

08487

Macku, Marcela

CHEMICAL ANALYSIS OF AEROSOL PARTICLES. METHOD FOR THE DETERMINATION OF NO3 AND NH4. ((Chemicke analysy aerosolovych castic. Metoda stanoveni NO3 a NH4.)) Text in Czech. Chem. Listy (Prague), 60(2):254-257, 1966. 12 refs.

The analysis of aerosol particles of individual compounds is of considerable interest for air pollution studies. Aqueous solutions of ammonium nitrate were atomized in a chamber and the aerosol was passed through a membrane ultrafilter at a rate of 7 l./min. The filter was then placed in a solution of 4% nitron in 10% acetic acid for 20 minutes. The spots which constitute a reaction product of NO3 with nitron were counted under a microscope. The NH4 particles were determined in a similar manner but with Nessler reagent. The spots did not fade after 6 months and the method was found to give reproducible results. Particle size distribution may also be determined.

08501

Heinz Engelhardt

AUTOMATIC ANALYZER FOR THE MEASUREMENT OF GASEOUS AIR POLLUTANTS. ((Automatische Analysatoren fur die Messung gasformiger Luft- verunreinigungen)). Text in German. Z. Instrumentenk. (Brunswick), 85(6):188-190, 1968.

The three principles used for measuring both the emission of gaseous pollutants from a source and their 'immission' are: (1) physical methods; (2) physical methods with the aid of chemical reactions; and (3) electrochemical methods. As a purely physical measuring method the photometric principle is employed in the ultraviolet, visible or infrared wavelengths. The disadvantage of this method is lack of sensitivity and it is therefore employed mainly for emission measurements, which are a thousand to ten thousand times larger than immission measurements. The second method, which depends first on a chemical color reaction with sub- sequent measurements with a photometer, is more sensitive. It will measure pollutants from 1 ppm down to 0.02 ppm. Ionization detectors with or without the aid of chemical reactions are also employed to a limited extent. Several photometers and ionization detectors are described and illustrated. The electrochemical methods are the most sensitive and selective. Numerous methods are available, but so far only the conductivity and galvanic methods have been employed for immission measurements. Several analyzers are described and illustrated. The preferred automatic method of analysis with a range of the smallest measurable con- centrations for the most important air contamination gases is tabulated.

08953

Lindvall, Thomas

MEASUREMENT OF ODOROUS AIR POLLUTANTS. (Bestamning av luktande luftfororeningar.) Text in Swedish. Nord Hyg. Tidskr. (Copenhagen), 47(2):41-71, 1966. 91 refs.

Psychometric methods for the sujective determination of odorous air pollutants are surveyed, with a discussion of the physiological and psychological bases of smell. Since odors are a a problem of emvironmental hygiene, they are studied at present by the determination of an odor threshold in a series of diluted air samples. Some of the problems involved in such determination of an odor threshold in a series of diluted air samples. Some of the problems involved in such determinations are mentioned: individual variation, adaptation, background variables, climate etc. Psychometric methods used, such as stimulus presintation and indicator response, and the pricciples of extrapolationg supralim- inal intensities, are discussed, as well as the different types of olfactometers. Odor thresholds found in the literature are rarely similar, due to the inaccuracy of the physical and chemical analytic methods used and to the varying statistical and sampling techniques employed. Different odors may also interact so that the threshold to the combined smells may not be merely additive. Annoyance from odors is best studied by epidemiological methods where the exposure dose is known.

09223

Kohler, M.and H. J. Eichoff

A RAPID METHOD FOR THE DETERMINATION IN ATMOSPHERIC DUST. ((0EINE Schnellmethode zur Bestimmung von mehrkernigen, aromatischen Kohlenwasserstoffen in Luftstaub.)) Text in German Z. Anal. Chem. (Berlin), 232(6):401-409, Nov. 24, 1967 5 refs.

The dust is sampled onto a cellulose asbestos filter and is extracted with benzene in a Soxhlet apparatus. The polycyclic hydrocarbons are then isolated from the extract, using 2-dimensional thin-layer chromatography on aluminum oxide-cellulose acetate. The eluted spots are analyzed by fluorospectroscopy, usually at normal temperature in solution or, in special cases, at lower temperatures in a solid state. About 70 percent of the polycyclic aromatic hydrocarbons originally contained in the dust are detected, as determined by a test with labelled 3,4-benzpyrene. The apparatus used is diagramed. (Authors summary, modified)

09721

Hofmeister, H. K., H. Hummel, and R. Kohlaas

CONTINUOUS DETERMINATION OF NO2 AND (NO + NO2) CONCENTRATION IN CHEMICAL PLANTS. ((Kontinuierliche Bestimmung der Konzentra- tion von NO2 und (NO & NO2) in chemischen Produktionsanla- German. Chem. Ingr.-Tech. (Weinheim), (1/2):61-64, Jan. 1968. 4 refs.

An apparatus is described for the continuous determination of NO2, or NO + NO2, in the gas stream of chemical production facilities. A photometer suitable for plant operations is used for the direct measurement of NO2 levels. NO is oxidized to NO2 (using I2O3 at 110 deg. C.) and the concentration of total NO2 is then determined. A dilution process was developed in order to avoid the extraordinary difficulties involved in the determination of degree- of-oxidation at high levels of nitrogen oxides. The apparatus, which is described and illustrated by graphs, diagrams, and one photograph, was tested in a nitric acid absorption plant.

09728

Nietruch, F., and K. E. Prescher

ON THE PHOTOMETRIC DETERMINATION OF SMALL QUANTITIES OF NO2. ((Beitrag zur photometrischen Bestimmung kleiner Stickstoff- dioxid-Mengen.)) Text in German. Anal. Chem. (Berlin), 234 (2):118-119, 1968. 4 refs.

When NO2 is introduced into an acetate solution of sulfanilic acid and N-(1-naphthyl)ethylenediamine dihydrochloride, a red azo-dye is formed. This reaction is utilized for the photometric determination of small quantities of NO2. The process can be calibrated either by means of defined NO2-air mixtures, or by the use of sodium nitrite solutions, which are easier to handle but re- quire certain conversion factors. Since these factors recently have been disputed, calibration with a N2O4-air mixture, prepared by direct two-stage dilution, was investigated and compared with the sodium nitrite method. It was found that 0.95 moles of No2 correspond to one mole sodium nitrite.

Details of the apparatus and results of more extensive experiments are not shown.

10092

Mirowska, Ewa

METHODICAL STUDIES ON THE DETERMINATION OF LOW CONCENTRATIONS OF NITROGEN OXIDES IN THE ATMOSPHERIC AIR. (Badania metodyczne nad oznaczaniem niskich stezen tlenkow azotu w powietrzu atmosferycznym Text in Polish. Med. Pracy (Lodz), 17(3):218- 222, 1966. 3 refs.

The Griess-Illosway method is most often used to determine low concentrations of nitrogen oxides in the air and is known to detect microgram NO_2 in 16 ml. of solution. To determine values within th range of the maximum permissible concentration (NDS) in working places set legally at 5 mg/cu m, a 0.2 l. air sample must be taken. In case of low nitrogen oxide levels in the atmospheric air, taking l. air sample will permit detection of 0.1 mg/cu m, which is 50 times lower than NDS. Therefore, this latter volume is more satisfactory for use in determining the presence of atmospheric nitrogen oxides. The precondition for observations within the 0.1 cu m range is a series of absorption tests of nitrogen oxides by a aqueous solution of sodium hydroxide and another series involving t reaction of nitrites with the Griess- Illosway reagent. Color reaction is most efficient at pH 3. The error of the described method is plus or minus 95 for a sample containing 1-10 micrograms nitrites.

10221

Goroshko, B. B., V. S. Eliseev and Y. Ya. Nazarenko

THE TECHNIQUE FOR OBSERVING ATMOSPHERIC AIR POLLUTION BY MEANS OF A HELICOPTER. ((Ktekhnike nablyudenii atmosfernolo zagryazneniya s pomoshchyu vertoleta.)) Text in Russian. Tr. Gl. Geofiz. Observ. (Leningrad), No. 208:86-81, 1968. 6 refs.

The use of helicopters for collecting air pollution samples involves the difficulty that turbulence caused by the blades can distort the results. A study of the flow configuration around a helicopter showed that withdrawal of samples for air pollution studies is optimum at a flight velocity of 50-80 km/hr. and with the sampler placed 1 m in front of the fuselage. In this case, sampling is not affected by the turbulence generated by the blade rotation. An aspirator for air inlet velocities of 15-20 m/sec was designed for determining aerosol or gaseous contaminants. The aspirator is equipped with a rotary pump and four sample inlets each equipped with a flow meter. The air flow rates in the aspirator can be adjusted from 0 to 3 l/min. The instrument was tested for measuring the parameters of a smoke plume.

10315

A. German, J. Panouse-Perrin and A. M. Quero

COLORIMETRIC MEASUREMENT OF OZONE. (Dosage colorimetrique de l'ozone.) Text in French. Ann. Pharm. Franc. (Paris), 25(2):115-120, Feb. 1967. 2 refs.

The reaction of O_3 with a mixture of N-phenyl-2-naphthylamine and o-dichloro-benzene is studied. Development of the brown- orange color is not inhibited by the presence of O_2 or nitrogen oxides so that the intensity of the color produced is proportional to the amount of O_3 present. A special apparatus for use with this reaction is described, consisting primarily of a spherical cell, described previously, which is used for bubbling. Comparative analyses with the Guereau apparatus (iodometric analysis) indicate that this photometric method is sensitive to levels which are below the olfactory threshold (0.026 ml O_3). At this low concentration, the air with ozone must be bubbled through the reagents for 30 min.

10369

Bock, Rudolf and Klaus Schutz

GAS-CHROMATOGRAPHIC DETERMINATION OF DINITROGEN OXIDE TRACES IN AIR. ((Gas-chromatographische Bestimmung von Distickstoffoxid-Spuren in Luft.)) Text in German. Z. Anal. Chem. (Munich), 237(5):321-330, May 9, 1968. 26 refs.

Traces of dinitrogen oxide in the atmosphere are collected on a molecular sieve (5 A) at normal temperature, desorbed at reduced pressure at 250-300 Degrees C., and measured by gas chromatography. Measurements range from 0.19-0.29 ppm (372-560 microgram N_2O/cu m air). The standard deviation of this method is plus or minus 4.3% (16 measurements). The apparatus used is described.

11573

Lahmann, Erdwin

STUDIES ON AIR POLLUTANTS. II. MEASUREMENT TECHNIQUES AND EVALUATION. ((Die Untersuchung von Luftverunreinigungen. German. Bundesgesundheitsblatt, (11):161-167, May 26, 1967. 29 German. Bundesgesundheitsblatt, (11):161-168, May 26, 1968. 29 refs.

The second part of a detailed review of techniques for measuring the concentration of air pollutants deals with various parameters of the sampling procedure which affect the results of all analytical methods. These parameters include: the duration of the sampling period (or frequency of measurements), duration of the study, season and time of day when the samples are taken, frequency of discontinuous sampling, air density at the measuring sites, height of the sampling sites above the earth, and distribution of the sampling sites. The effects of some of these parameters on determinations of atmospheric SO_2 and CO are shown by way of illustration. Sampling programs used in the German Federal Republic, Great Britain, and the USA (National Air Sampling Network and Continuous Air Monitoring Program) are described briefly. Finally, some of the problems arising in the evaluation of experimental air pollution data are pointed out (such as the skewed rather than Gaussian distribution of results).

11574

Lahmann, Erdwin

STUDIES ON AIR POLLUTANTS. I. ANALYTICAL METHODS. ((Die Untersuchung von Luftverunreinigungen. I. Analysenmethoden.)) Text in German. Bundesgesundheitsblatt, (10):145-150, May 12, 1967. 71 refs.

This detailed review of the apparatus and techniques used for air pollution measurements deals with both sampling and analytical methods. A distinction is made between empirical or discontinuous and continuous methods of sampling and it is pointed out that only the latter can yield readily interpretable results. In connection with gas sampling techniques, the value of an impinger for increasing the rate of dissolution of gaseous pollutants is discussed. Methods are then described for the quantitative determination of SO_2, SO_3, NO_2, NO, CO, H_2S, HF, and NH_3, and brief mention is made of the techniques of gas chromatography and flame ionization detection for traces of organic compounds. The two principal techniques for estimating the total particulate content of the air are dust-fall and dust-concentration determinations. The latter which depends on photoelectric measurement of the particle density after filtration is more difficult to perform, but more interesting from the health point of view.

11631

Benarie, Michel and Bui-The-Chuong

UTILIZATION OF CERTAIN PLASTICS IN THE SAMPLING AND STORAGE OF POLLUTED AIR. (Sur l'utilisation de certaines matieres plastique pour le prelevement et la conservation des echantillons d'atmospheres polluees). Preprint, Institut National de Recherche Chemique Appliquee, Vert-Le-Petit (France), Nov. 6, 1968. 8 refs. Translated from French. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 9p.

Because the use of plastic bags for the sampling and storage of polluted air often results in the loss of pollutants, various plastic materials were compared with respect to their permeability to sulfur dioxide. The results are presented in a table of permeability, diffusion, and solubility constants. The physical phenomenon of loss due to the diffusion and dissolution of the gas is discussed. A Mylar spherical 100-liter bag 50 micron thick containing air with approximately 1 ppm SO2 loses 1.6% of the SO2 over 24 hrs in an environment of 0 ppm SO2. Materials with a lower permeability for SO2 are methyl polymethacrylate, Lumiphane, Vinyril, and Nomex. In addition, permeability is diminished by the incorporation of a metal into the film.

11819

Breuer, Wolfram

NEW METHODS OF CONTINUOUS TRACE GAS ANALYSIS. (Neue Verfahren zur kontinuierlichen Spurenanalyse). Preprint, 23p., 1968. 2 refs. (Presented at the Interkama Kongre, 4th, Duesseldorf, Germany, 1968.) Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 23p.

Electrochemical trace gas measuring units for determining the concentration of pollutants in the open air are described. The units operate on the principle of a galvanic chain, indicating concentration changes of ions in a solution caused by reaction with a sampled trace gas. The sampling gas and the solution are held by a solid electrolyte cast into a cylindrical silver tube which serves an an anode. The cathode is embedded in the inner surface of the electrolyte in the form of a silver helix. Electrical connections for both electrodes run through a polyethylene stopper at the bottom of the tube. The flow of sample gas reaches the actual measuring zone, the inner surface of the electrolyte, through a glass line and a polyethylene stopper at the top of the tube. The measuring ranges of standard units extend from several ppb (dilution of 10 to the minus 9th power) to several ppm (dilution of 0.000001, depending on the gas component. Concentration cells are now available for analysis of hydrogen sulfide, nitrogen dioxide, nitrogen dioxide and nitric oxide, phosgene, hydrogen cyanide, chlorine, oxygen, and ozone.

11861

Basargin, N. N. and N. A. Nikitina

RAPID TITRATION METHOD FOR THE DETERMINATION OF SULFATE ION IN PHOSPHORIC ACID WITH NITCHROMAZO INDICATOR. (Ekspressnyi titrimetricheski metod opredeleniia sul'fat-iona v fosfornoi kislote s indikatorom nitkhromazo). Zavodsk. Lab. (Moscow), 32(5):517-519, 1966. 5 refs. Translated from Russian. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 6p.

A rapid volumetric method is described for the determination of sulfate ions in phosphoric acid obtained by extraction. The method is based on direct titration of sulfate ion by barium salt at pH 1.7-2 in a 40-50% alcoholic solution, in the presence of Nitchromazo indicator and phosphate ions. The determination time is 15 min. Because of its rapidity, dependability, and accuracy, the method is recommended for serial analyses in the control of phosphoric acid production by the extraction process. It may also be used with some modifications in the analysis of phosphoric fertilizers. Automatization of the method is possible in the future. (Author summary modified)

11948

Kuznetsoff, V. I. and N. N. Basargin

METAL INDICATOR FOR BARIUM IN VOLUMETRIC SULFATE DETERMINATION IN THE PRESENCE OF PHOSPHATES AND ARSENATES. (Metalloindikator na barii pri ob'ennon opredelenii sul'fatov v prisutstvii fosfatov i arsenatov). Zavodsk. Lab. (Moscow), 31(5):538-40, 1965. Translate from Russian. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 8p.

A new indicator, Nitchromazo, is used for determining sulfate ions by barium salt titration in the presence of two-fold amounts of arsenate and thirty-fold amounts of phosphate. During titration in a 50% alcohol-water solution, Nitchromazo interacts with barium in an acid range (pH 2.0) producing a contrasting reaction and a sharp color change from a violet to blue. Nitchromazo is synthesized by conjugation of diazotized 4-nitroaniline- 2-sulfonic acid with chromotropic acid in the presence of Ca(OH)2. For determining sulfates in the range of 0.04 to 0.4 mg in the presence of arsenates (range 0.16 to 1.6 mg) or phosphates (range 0.2 to 2.0 mg), one drop of 0.2% aqueous solution of Nitchromazo is added, together with 10 to 15 ml of alcohol or acetone to a 10 to 15 ml solution with an acid strength of 0.01 M HCl (pH 2.0). The solution is then titrated with 0.005 -0.01 M BaCl2 until the violet color of the solution changes to blue. With small amounts of sulfate, the titration should be stopped at an intermediate color of the indicator. The molarity of barium is determined by a prior titration with sodium sulfate of sulfuric acid in the presence of an appropriate indicator.

11967

Lantheaume, R.

INDUSTRIAL CONTROL ANALYSIS OF BLAST FURNACE TOP GAS BY GAS CHROMATOGRAPHY. Rev. Met. (Paris), 61(12):1061-1063, 1964. 3 re Translated from French. Henry Brutcher, Technical Translations, Altadena, Calif., 8p.

An industrial chromatograph was developed for the analysis of blast furnace top gas the components of which are hydrogen, nitrogen, carbon monoxide, and carbon dioxide. The instrument is constructed in two parts. The first part consists of the measuring head, placed in an anti-deflagrating container and controlled thermostatically to 1/10 C. This unit is located as near as possible to the sample point. It includes the cell, cocks, and columns in the upper section, and the electrovalves for controlling the cocks and the carrier gas supply regulator for the lower part. The second section is the electronic unit (supply and programming). It includes the stabilized supply for the measuring bridge, controls for temperature regulation and auxiliary components, and the programmer and sensitivity indicators. In the first unit, a column of silica gel is connected in series with a column of 13x molecular sieves. The sample volume is introduced at the top of the column of silica gel. Hydrogen, nitrogen, and carbon monoxide are separated in the sieve column. After eluting the CO2, the system is switched to eliminate the sieve column from the circuit, and the CO_2 is removed. About five minutes are required for analysis of the gas mixture.

12321

Basargin, N. N. and K. F. Novikova

TITRATION MICROMETHOD FOR THE DETERMINATION OF SULFUR IN ORGANIC COMPOUNDS PHOSPHOROUS AND ARSENIC UTILIZING THE NEW INDICATOR NITCHROMAZO. (Titrimetricheskii mikrometod opredelieniia sery v fosfor- i mysh'isksoderzhashchikh organicheskikh soedineniiakh s novym indikatorom nitkhromazo). Zh. Analit. Khim. (Moscow), 21(4):473-478, 1966. 14 refs. Translated from Russian. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 13p.

A rapid titrometric method for determining sulfur in the presence of phosphate and arsenic ions utilizing the new barium indicator Nitchromazo (2,7-bis-(4-nitro-2-sulfobenzol-1-azo)-1,8-dihydroxynapthalene-3,6-disulfonic acid) is described. The test compound is first decomposed by the Schoeniger method and then titrated with barium salt in the presence of the indicator. A sharp and sensitive reaction with barium occurs at pH 1.7-2.0, eliminating phosphate interference completely and arsenate and chromate interference, partially. Such determinations exhibit a standard deviation of plus or minus 0.3. Analytical characteristics and synthesis of Nitchromazo are also described. (Author summary modified)

13070

Himi, Yasuji and Fumio Muramatsu

SAMPLING METHOD FOR DETERMINATION OF NITROGEN OXIDES IN FLUE GAS. (Endo-haigasu chu no chisso-sankabutsu bunseki-yo shiryo-gasu saisyu-ho no kento). Text in Japanese. Bunseki Kagaku (Japan Analyst, Tokyo), 18(6):710-716, 1969. 6 refs.

The concentrations of nitrogen oxides in exhaust gas emitted from oil-fired boilers were measured by using three kinds of gas sampling apparatus, and the sampling method for their determination in flue gas was examined. The values of nitrogen oxides by the gas sampling apparatus prescribed in JIS K 0104 agreed well with those by direct gas sampling through capillary tube and by a bottle containing 22% sodium chloride solution as the trapping liquid. The concentration of nitrogen oxides was invariable at any sampling point in the same section of flue. The bubbler containing 0.1 N sodium hydroxide solution used for the determination of nitrogen dioxide in flue gas had high absorbing efficiency for carbon dioxide, and the volume of gas must be corrected for this influence by titration of carbonate ion in the absorbing solution after sampling. (Author abstract modified.)

13989

Oblaender, K. and D. Kraeft

DETOXICATION OF AUTOMOTIVE EXHAUST GASES - MEASURING METHODS AND TEST CYCLES. (Abgasreinigung an Kraftfahrzeugen - Messverfahren und Testzyklen). Text in German. ATZ (Automobiltechnische Zeitschrift) (Stuttgart), 71(4):117-124, 1969. 24 refs.

Detoxification of automotive exhaust gases raises not only motor engineering problems but also measurement engineering problems. The various methods for measurement of CO based on heat conductivity, on heat evolution and an infrared absorption are discussed and compared. The disadvantages of hydrocarbon measurements in the hexane range and of the flame ionization method are pointed out. Also discussed are the measurement of nitric oxide and the existing and planned multi-stage test cycles. A brief discussion of the possibilities of lowering the exhaust gas emission by motor modifications, the effects of traffic, and the fuel composition is included.

14076

Breuer, Wolfram

NEW METHODS OF CONTINUOUS TRACE ANALYSIS. (Neue Verfahren zur kontinuierlichen Spurenanalyse). Text in German. Arch. Tech. Messen, no. 396, p. 7-12, Jan. 1969. 2 refs.

A detailed description is given of two electrolytic continuous recording devices for measurement of small traces of gases present, for example, in atmospheric air. An earlier version with a liquid electrolyte was based on Nernst's concept of a concentration chain. The new version uses an organic substance as an electrolyte which has a high dielectric constant, a low electric resistivity, a low vapor pressure, is but slightly hygroscopic, and possesses a high melting point. This electrolyte is solid and is part of a monolithic, small and rugged unit. The accuracies of measurements made by these devices vary between dilutions of 10 to the minus 9th power and 0.000001, depending on the kind of gas. At present, the following gases can be determined with these accuracies: O_2, O_3, Cl_2, NO_2, NO_2 plus NO, H_2S, HCN, and $COCl_2$.

14213

Haentzsch, Siegfried, Frank Nietruch and Karl-Ernst Prescher

CONTINUOUS DETERMINATION OF NITROGEN DIOXIDE IN THE AIR WITH AN AUTOANALYZER. (Kontinuierliche Bestimmung von Stickstoffdioxid in Luft mit dem Autoanalyzer). Text in German. Mikrochim. Acta (Vienna), no. 3:550-556, 1969. 17 refs.

For continuous nitrogen dioxide measurement in air, a Technicon autoanalyzer was used. A sample gas flow was drawn in through a reaction zone where it was brought in contact with a Saltzman solution. After reaction with the nitrogen dioxide, the major part of the solution went to a colorimeter. The transparency of this solution was measured and recorded. The following reaction zones were used: a siphon, a vertical reaction tube of about 60 cm length and 3.2 mm inner diameter, the gas sample and reagent passed in parallel flow, as well as in counter flow, through the tube, a helical tube, and a micro frit for continuous flow of the Saltzman solution. For calibration, a continuously produced mixture of NO_2 and air was used. In all types of reaction zones, reliable NO_2 measurements were obtained. The measured concentrations were found to lie in the maximum allowable concentration range (present long-term maximum allowable concentration equal 1 mg/cu m). With the 60 cm tube, it was found that neither the flow velocity nor the direction of the gas sample had any influence on the measured value. An adjustment time of 2 min was required for NO_2 concentrations between 0.32 and 3.2 mg/cu m. In the 20 m tube, adjustment took about 60 min at concentrations between 0.11 and 1.10 mg NO_2/cu m. For the micro frit, a low-volume container must be used for the adjustment period to remain short. The detection thresholds were found to be 5 micrograms/cu m for the 20 m helical tube and 0.15 mg/cu m for the 60 cm tube. The only disadvantage of the method is the complicated calibration process.

14435

Holzhey, Joachim and Horst Demmrich

A RADIOMETRIC DEVICE FOR CONTINUOUS CONTROL OF FLUE DUST CONCENTRATION. (Ein radiometrisches Geraet zur kontinuierlichen Kontrolle des Gichtstaubanfalls). Text in German. Neue Huette, 14(4):198-201, April 1969. 2 refs.

A radiometric method based on radiation absorption which can be used for determining the flue dust concentrations in furnaces is described. Gamma or X-rays are used for the measurements. The equipment consists of a radiation transmitter on one side of the flue duct and radiation detector on the other side. Since the ducts are rather thick-walled, drillings of 8 and 25 mm in diameter are necessary; they are sealed by windows. The measurements were conducted with a radiation energy of 10 keV, and with an anode current of 1mA. The results are graphically illustrated by a plot of the radiation extinction as a function of the dust concentration. Since the dust composition was unfavorable with respect to the mass extinction coefficient, absorption of the X-rays was minor. Disregarding the fact that insufficient individual measurements were taken, a dust measurement error of roughly plus or minus 5 g/cu m was obtained. These measurements were taken on an experimental set-up, where air was drawn through a pipe to which certain quantities of dust were added. To illustrate the method in practical use, measurements were also taken in the downward flue a furnace. Aside from dust deposition at the radiation inlet window, no problems were encountered, although a final conclusion must be witheld, since test measurements are still being made.

14486

Uhi, K.

THE DETERMINATION OF ACIDIC GASES IN WORKING ENVIRONMENTS BY ALKALI FILTER PAPER. (Alkali roshi ho ni yoru sagyo kankyo chu sansei gas no sokutei). Text in Japanese. Nippon Eiseigaku Zasshi (Japan J. Hyg.), 24(1):49, April 1969.

The alkali filter paper method for determining acid gases in working environments entails soaking filter paper in a 30% potassium carbonate solution, drying the paper in air, and putting it in a vinyl holder having an exposure area of 64 sq cm. Absorbed gases are extracted with distilled water and determined qualitatively and quantitatively. The required exposure time is determined by the type of acid being measured, the production process, and the sensitivity of the determination method. Generally, 1 to 8 hrs are appropriate for acidic gases like SO2, HCl, and NO2, and 8 to 24 hrs for acid mists of sulfuric, phosphoric, and chromic acids. One hour is usually required for SO2 measurements by the para-rosaniline formaline method; the CL-Ba method requires 8 to 24 hrs. When the relationship between the amount of SO2 adsorbed on the filter paper and the average gas concentration in the working environment is plotted, a curve is obtained. Thus, on a per day basis, the coefficient of conversion depends on the amount adsorbed. However, the graph for an hour of exposure time is linear, suggesting that shorter exposure times would be convenient for the calculation.

14710

Hajduk, J.

IMISSIONS AND OCCURRENCE OF NECROTIC SPOTS ON THE PLANT LUZULA ALBIDA (HOFFM.) DC. (Imisie a vyskyt nekrotickych skvrn na rastline Luzula albida (Hoffm.) DC). Text in Czech. Ochrana Ovzdusi, no. 3:42-45, 1969. 5 refs.

Because of its increased surface area in comparison to the portion of the earth's surface it occupies, vegetation creates conditions for catching a great amount of emmisions. The ratio between the amount of emissions trapped and earth surface is a significant indicator of tree damage and secondary air pollution. Herbst found that entrapment of emission particles is governed by space orientation of leaves on a plant, by shagginess, by the number of individual plants, and by the size of individual emission particles. Chvapil concluded that the ability of lindens, birches, and acacias to entrap particles is related to leaf smoothness and the space orientation of leaves. The present investigation shows that the ability of Lazula albida (Hoffm.) DC to catch emissions from rainfall is the result of the shape of leaves and their orientation on the plant. Emissions settle on the leaves of this plant, providing a mask for necrotic markings caused by toxic soluble substances. As indicated by microscopic analysis, these substances originate in products of industrial emissions. The amount of sediment and the size of necrotic spots is influenced by peculiarities of individual plants and plant ecology, as well as by emission concentration. A rough picture of pollution of the lower atmosphere can be gained from a study of this plant, which predominates in European woods.

15171

Yamate, Noburu

MANUAL METHODS AND AUTOMATIC CONTINUOUS INSTRUMENTS FOR MEASUREMENT OF GASEOUS AIR POLLUTANTS. (Gasujo taiki osenshitsu no sokutei to sono sokuteikiki). Text in Japanese. Kogai to Taisaku (J. Pollution Control), 5(10):785-796, Oct. 1969. 36 refs.

In order to prevent air pollution, measurement of pollutant concentrations must be continuously performed. In this report, both continuous monitoring and manual analyses of typical air pollutants are reviewed. Numerous methods are tabulated and most of them are explained, with particular attention to continuous methods and apparatus. Sulfides are measured manually by colorimetric analysis with rosaniline or barium molybdate, by the lead per oxide method, or by test paper methods. Sulfides are also measured continuously by means of solution conductance (Thomas autometer) or by optical absorption with rosaniline or with iodine-starch. Carbon monoxide is measured manually with palladium sulfate and ammonium molybdate, by gas chromatography, or by the hopcalite method. It is measured continuously by infrared or ultraviolet absorption of reduced mercuric oxide. Nitrides are measured manually by the Saltzman or the Jacobs method, or with ortho-tolidine sulfate. Hydrogen sulfide is measured manually by methylene blue and continuously by a colorimetric filter paper method. Hydrocarbons are measured manually by gas chromatography and continuously by flame ionization detectors. Formaldehyde is measured manually by colorimetric analysis with a chromotropic acid or with acetylacetone, or by the MBTH method. Ozone is measured manually by the phenolphthalein or the potassium iodide method and continuously by coulometric titration or by optical absorption with potassium iodide. Fluorides are measured manually by colorimetric analysis with thorium neothron(?) or lanthanum alizarin complex and continuously by filter paper fluorescence. Actual Tokyo data on changes in the concentrations of carbon monoxide, nitric oxide, and nitrogen dioxide are tabulated.

15342

Nucciotti, Francesco, Paolo Mandrioli, and Giovanni Sandri

IMPROVEMENTS IN SAMPLING TECHNIQUES AND IN THE METHODS FOR DETERMINING ACID GASES IN THE

ATMOSPHERE. (Miglioramenti tecnici nel campionamento e nella metodica per la determinazione di gas acidi nell'atmosfera). Text in Italian. Riv. Ing., no. 5:353-356, May 1969. 11 refs.

Deterioration of pine forests near industrial complexes on the Tyrrhenian and Adriatic seacoasts of Italy led to systematic investigation of air pollution. Chief offenders were found to be the sulfur and nitrogen oxides. To build a sampling network meant developing a practical method, easily reproducible and low in cost. The method of Syozo-Fukui, using a filter soaked in a concentrated K2CO3 solution, seemed best. Analysis of the filter permits determination of SO3, the oxides of nitrogen, and chlorides. Results were good when the relative humidity was below 70%. The filter salt was highly deliquescent, and above 70% humidity significant quantities of test substance escaped. Therefore, a framework equipped with an interchangeable condenser and sheltered by an acrylic plastic casing, the whole being enclosed in a meteorological shelter was provided to hold the filter. For transportation to the laboratory, the filter was sealed hermetically in polyethylene. The method of Fukui was used for nitrogen oxides, but for SO3 that of Johnson-Nishita was preferred: reduction of all sulfur compounds to hydrogen sulfide, measured colorimetrically with methylene blue to a sensitivity of 0.2 ppm. A Schleicher 589 filter was used immersed in K2CO3 solution and dessicated in a vacuum. At the laboratory, nitrogen oxides, sulfur, H2S, and sulfides were determined spectrophotometrically. Agents used for determining nitrogen oxides were sulfanilamide, naphthylethylenediamine, hydrochloric acid, and a standard solution of NO2.

15346

Iinoya, Koichi, Shin-ichi Yuu, Kazutaka Makino, and Kazuhiko Nakano

ON MEASUREMENT OF PARTICLE SIZE DISTRIBUTION BY CASCADE IMPACTOR; IN CASE OF SETTLING THE CLEARANCE RATIO THREE FOR ROUND NOZZLE. (Kasukeido-impakuta ni yoru ryudo sokutei jo no mondaiten; enkei nozuru kankaku-hi 3 no baai). Text in Japanese. Kagaku Kogaku (Chem. Eng.), 33(7):689-695, July 1969. 4 refs.

The weight of small particles can be measured by the use of a cascade impactor within the smoke duct. The cascade impactor used in this case had a series of six nozzles, the diameters of which ranged successively from 0.526 to 0.112 cm, and the distance between each nozzle and its collection plate was fixed at three times the length of the nozzle diameter. A millipore filter was used after the smallest nozzle to collect the smallest residual particles. The experimental particles were fly ash and mica powder. Particles of all sizes were sent from the largest to the smallest nozzle. At each stage, all particles larger than the nozzle diameter and 50% of those having the exact size of the nozzle could not pass through and were collected on the plate; the smaller particles all passed through, and the process was repeated at each nozzle until the millipore filter was reached. It was found that a partial separation efficiency curve obtained with an aerosol of a single kind of particles can be adapted to aerosols containing many types of particles. Separation efficiency was reduced by backscattering; the minimum weight of collected particles which causes backscattering increased with particle size. The diameter of the aerosol particles can be measured by using a cumulative separation efficiency curve.

15372

MAINTENANCE OF AIR PURITY AND DETERMINATIONS OF IMMISSION BY THE ALUMINUM INDUSTRY: FLUORINE POLLUTION, ESPECIALLY HYDROGEN FLUORIDE GAS, IN WASTE GASES CAUSES DAMAGE TO VEGETATION. (Luftvard och immissionskontroll i aluminiumindustrin: fluorforeningarna, sarskilt det gasformiga fluorvatet, i avgaserna). Text in Swedish. Tek. Tidskr., 99(12):251-253, May 27, 1969.

The Sundsvall aluminum plant, the only alumina-electrolysis plant in Sweden, operates 300 cells currently producing 65,000 tons of Al per year, representing a fivefold increase of production since 1962. To date the company has spent 20 million kronor (about $4,000,000 in 1969) on air pollution control equipment, but there is still some damage to vegetation from hydrogen fluoride gas. Comfort of workers requires 20 to 30 changes of air per hour (12 million cu m/hr) in pot-line area, which complicates air pollution control. Most recent of several air-washing devices used in a 'spin bath' in which plastic balls are sprayed with water from jets. Exhaust gases escape through four 70-m concrete chimneys, 10-11 m in diameter and lined internally with plastic. The equipment removes 90% of water- soluble fluorides from exhaust. The company also maintains 160 inspection stations in the area, which by means of pollutant- sensitive plants record the immission of toxic material, which is the basis of a map of Sundsvall region with 'isofluoride' lines to indicate pollution zones.

15521

Nietruch, Frank and Karl-Ernst Prescher

DILUTION SYSTEM FOR LOW CONCENTRATIONS OF NITROGEN DIOXIDE AND DETERMINATION OF THE SALTZMAN FACTOR. (Dosierung kleiner Stickstoffdioxid-Mengen und Bestimmung des 'Saltzman-Faktors'). Text in German. Z. Anal. Chem., vol. 244:294-302, 1969. 40 refs.

A dynamic flow system is described by which dinitrogen tetroxide (N2O4) is diluted with air in two steps to obtain NO2 concentrations in the ppm range. Through thermostatization of the first stage, the dissociation of the dinitrogen tetroxide could be taken into account during calculation of the NO2 end concentration. With the NO2/air mixture obtained by this method, the Saltzman photometric analysis of NO2, which is based on the formation of an intensely colored azo dye was tested. The results obtained with gaseous NO2 and with equivalent amounts of aqueous nitrite solution are compared. At a concentration of 1.5 micrograms NO2 per 25 ml absorbing solution, the dye formation by 1 mole NO2 equals that of 1 mole of nitrite ('Saltzman-factor' 1.0). If the concentration is 10 micrograms/25 ml, the intensity of the color effect due to 1 mole of NO2 equals 0.86 moles of nitrite ('Saltzman-factor' 0.86). Only half the expected color intensity was found when a NO2/air mixture was used that had been prepared by a dynamic two-step dilution and oxidation of NO ('Saltzman-factor' 0.5).

15606

Tani, Tamio and Kimio Kato

RESULTS OF EVALUATION AND PERFORMANCE OF MODEL 68-5 SO2 ANALYZER/RECORDER. (Aryusangasu renzokujidosokutei kirokusochi (moderu 68-5 gata) no shiken kekka ni tsuite). Text in Japanese. Kogai to Taisaku (J. Pollution Control), 5(12):1027-1029, Dec. 15, 1969.

The results of tests performed on the Model 68-5 SO2 Analyzer/ Recorder (manufacturer not given) are reported. The operation procedure is based on the Thomas principle. Sample air is led through a hydrogen peroxide solution which produces sulfuric acid by the oxidation of sulfur. The sulfuric acid produced is detected by the fluctuation of conductivity, using platinum electrodes. Model 68-5 records the density of sulfurous gas through the amplifier. Its attributes include the following: relatively small size; light weight compared to the conventional types; and prompt measurement in a short time (10 minutes average time required). The sample cell is made of glass. The reagents used for the test were 1 l water with 30% hydrogen peroxide and 1 ml of 0.01 N sulfuric acid. A standard solution of sulfurous gas was used for calibration. The test covered the determination of a standard graduation; examination of the fixed zero point; constant air flow test; examination of sensitivity calibration; rosaniline test; and a comparison of Model 68-5 with instruments made by other companies. Model 68-5 was observed to have stable electric systems and a slight sample air fluctuation. Based on the trial test carried out for five consecutive days, Model 68-5 was considered to constitute a continuous measurement for a considerable operation period.

15642

Terabe, Motoji

MEASUREMENTS OF DUST FALL AND SUSPENDED PARTICULATE MATTER. (Baijin sokutei to sono sokuteikiki ni tsuite). Text in Japanese. Kogai to Taisaku (J. Pollution Control), 5(10):777-784, Oct. 10, 1969. 5 refs.

A general classification of dusts in dust fall and suspended particulate matter was presented with an emphasis on sampling and measurement devices. Various types of instruments described are practical and recently developed for dust measurement. The widely used devices for dust fall measurement are the deposit gauge and dust jar. For suspended particulate matter measurement, the tape sampler, high-volume sampler, and digital dust meter (automatic recording system) were discussed. The Andersen Dust Sampler was described. The results of a comparative study on the numerical values obtained by several types of samplers, conducted in July, September to October of 1968, and January of 1969 indicated a proportional relationship among the numerical values. Five kinds of samplers were examined: high-volume sampler, cyclone high-volume sampler, tape sampler, digital dust meter, and digital dust meter proofer. Daily averages measured by tape sampler had a close correlation with those of the high-volume sampler. The proportional relationship of total average was found to be 1 C(ohs)/1000 ft equals 100 microgram/cu m. Results of the digital dust meter for respirable dust movement were included.

15752

Hatterer, Andre and Michel Forissier

PSEUDOCHROMATOGRAPHIC MICROANALYSIS UTILIZING GAS-SOLID EQUILIBRIA. DETERMINATION OF NO2, NOCl, Cl2, HCl, CO2 AND H2O. (Microanalyse pseudochromatographique utilisant les equilibres gaz-solide. Dosage de NO2, NOCl, Cl2, HCl, CO2, H2O). Text in French. Z. Anal. Chem., vol. 247:266-271, Oct. 1969. 12 refs.

Gas separation was carried out in two stages, condensation and sublimation, in a small metal tube exposed to a temperature gradient from 77 to 300 K. A non-condensable gas such as helium, hydrogen or nitrogen was used as a carrier. In the first stage, the components of the mixture were selectively solidified in the cooled tube under partial pressures below those of the triple points. In the second stage, heating of the tube with an inverted temperature gradient caused sublimation and completes the separation. Catharometers or mass spectrometers were employed for the detection and determination of the gases. Gases could be determined in the range of 0.000001 to 0.0001 mole/ml of gas. (Author abstract modified)

16056

Kemeny, Etal and E. C. Halliday

METHODS RECOMMENDED FOR THE MEASUREMENT OF AIR POLLUTION IN SOUTH AFRICA. Council for Scientific and Industrial Research, Pretoria South Africa, National Physical Research Lab., CSIR-FIS 10, 12 p., 1964. 3 refs.

A standard method, suited to South African conditions, for measuring atmospheric sulfur dioxide concentrations is described. The method is based on the reaction between sulfur dioxide and hydrogen peroxide. The principle of the hydrogen peroxide method consists of drawing a measured volume of air through a gas-washing bottle containing a dilute solution of hydrogen peroxide. The resultant increase in acidity of the solution is determined by titration using a pH meter, and the sulfur dioxide concentration in the air is calculated from the amount of titrant used. The method is not specific because it also measures gaseous acidity; it is affected negatively by ammonia and positively by acid or acid-forming compounds present in the air. Normally the concentrations of these interfering substances are much smaller than those of sulfur dioxide and can be ignored. The measurement of sulfur dioxide can be combined with the measurement of smoke and suspended matter primarily by drawing the air stream through a filter paper. The apparatus used for sampling is inexpensive and simple to use. Despite its nonspecificity, the hydrogen peroxide method is the simplest and most suitable for measuring sulfur dioxide and is recommended for the continuous measurements.

16230

Breuer, Wolfram

THE INFORMATION SUPPLIED BY CONTINUOUS IMMISSION MEASUREMENTS. (Die Aussagekraft kontinuierlicher Immissionsmessungen). Inst. Ind. Water Econ. Air Pollution Forum, vol. 3, 12p., 1965. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 26p.

Effective measures against air pollution require an extensive knowledge of the type, origin, distribution, and effect of air pollution. Many complex interactions are uncovered by emission measurements and their evaluation. The potential of modern measuring techniques are discussed and illustrated by examples from the air monitoring program of the Farbenfabriken Bayer AG, where more than 20 automatic emission measuring units for various gas components have been erected. Characteristic parameters of emission concentrations are obtained by plotting cumulative frequency curve over a logarithmic abscissa. A 50% value of the cumulative frequency curve indicates the most probable emission to be expected for recovery periods after the occurrence of peak concentrations. The peak concentrations are characterized by the 95% value of the cumulative frequency. The numerous data supplied by automatic monitoring units is rapidly digested by this statistical method. The data obtained permits a classification according to certain criteria, such as the influence of wind velocity or direction, weather conditions, the time of day or season, etc. Half-hour emission values are correlated with wind direction data to provide information on the origin of emissions. Further valuable information on emission sources is derived from direct evaluations of simultaneous measurements of several gas components. These parallel measurements help to distinguish emissions from combustion processes in the open air from other emissions and provide information on the fuel used in the particular instance.

16298

Fiala, Ernst and Ernst-Georg Zeschmann

ANNOYANCE CAUSED BY ODOROUS EXHAUST GASES. (Laestigkeit von Abgasgeruch). Text in German. VDI (Ver. Deut. Ingr.) Z. (Duesseldorf), 109(24):1139-1141, 1967. 5 refs.

The intensity of odors caused by automobile exhaust gases was evaluated by measuring the odor intensity of dilutions of the exhaust gas with fresh air that exceeded the odor threshold. The tests were performed with a water-cooled four-cylinder, four- stroke Otto engine. The measurements were based on the following considerations. At low traffic density i.e., on well-ventilated streets, the exhaust gas odor is not noticeable; the odor threshold is not reached. With increasing traffic density, i.e., less ventilation, odor threshold is exceeded. The mass flows emitted under the latter condition were indicative of the dilution which was the measure for the odor intensity. The results showed the familiar independence of carbon monoxide and hydrocarbon concentrations from engine operating state. Test personnel could smell the exhaust gas independently of the operating state at 800- to 1000-fold dilution. The carbon monoxide and hydrocarbon concentrations at the moment the odor threshold was exceeded were between 1 and 100 ppm and 0.6 to 8 ppm, respectively. Addition of air in the exhaust system reduced the concentrations, but increased the odor intensity.

16335

Helbig, Herbert

USE OF AMPEROMETRY AND RELATED METHODS OF ELECTROCHEMICAL ANALYSIS IN OPERATING MEASURING TECHNIQUES. (Die Amperometrie und mit ihr verwandte elektrochemische Analysenmethoden in der Betriebsmesstechnik). Text in German. Chem. Tech. (Berlin), 21(9):553-557, Sept. 1969. 53 refs.

After reviewing the theoretical principle of amperometry, the determination of substances such as oxygen, chromate, nitric oxide, and sulfur dioxide by this method is discussed. Two metallic electrodes submerged in the solution to be analyzed are used. It is important that the reaction at the electrode is so rapid that only the substance transported from the solution to the phase boundary determines the reaction speed. The electric current at the electrode is then directly proportional to the concentration of the substance to be measured. For measuring nitric oxide, amperometry has the disadvantage that at concentrations of more than 2%, the substance transport is so rapid that the current density no longer depends on the concentration. In this case, it is better to use chronocoulometry. Potential is applied in jumps to the electrode instead of the stationary current and the current flowing within a certain time interval after the jump is integrated. For measuring SO2 in waste gases, waste gas enters a solution of 0.5 m sulfuric acid and 0.05 m potassium bromide at constant speed. Current enters the solution via two platinum electrodes. Bromine develops at the anode and is reduced by the SO2. The redox potential of the solution is measured with a third platinum electrode and a reference electrode. Minimum concentrations of 0.1 to 1 ppm and maximum concentrations of 1 to 10 ppm can be measured.

16543

Terabe, Motoji

METHODS FOR MEASURING GASEOUS AIR POLLUTANTS. (Yudoku gasu no kenchi sokutei to sono kanren kiki ni tsuite). Text in Japanese. Kogai to Taisaku (J. Pollution Control), 2(7):453-459, Aug. 15, 1966. 5 refs.

Measurements of air pollutants are roughly classified as chemical, physical, and biological. Chemical measurements are subdivided into test-paper, colorimetric, test tube, titration, gas volume, weight methods, etc. Physical methods are subdivided into mechanical, electrical, and optical method. Biological measurements make use of the human nose, small animals, and plants. The measuring methods are also classified according to time interval into integral, instantaneous, and continuous measurements. The collection method for test samples is divided into absorption tube, vacuum substitution, air substitution, liquid substitution, and automatic continuous gas sampler method. The absorption tube method and gas sampler used by National Air Sampling Network of the U. S. are discussed in detail. Sulfur oxides are measured by the West and Gaeke method, the lead dioxide method and recorded by the electric conductivity method. Nitrogen oxides are measured by the Saltzman method, the Yacobs method, and test tube methods, and recorded by an automatic recorder. Hydrogen sulfide is measured by the methylene blue method and recorded by an automatic recorder. Carbon monoxide is measured by hopcalite according to a test tube method, detected by Kitagawa detector, and recorded by an automatic recorder. Ozone is measured by iodimetry, phenolphthalein, ferrous thiocianate, the gum crack method, and an ozone meter. The operation of each instrument is reviewed.

16995

Draegerwerk, Heinr. and Bernh., Luebeck (West Germany)

METHOD TO PROVE OR DETERMINE PHOSPHOROUS AND/OR SULFUR CONTAINING COMPOUNDS IN THE AIR OR OTHER GASES BY FLAME PHOTOMETRY AND ITS EQUIPMENT. (Verfahren zum Nachweis oder zur Bestimmung von phosphor und/oder schwefelhaltigen Verbinddungen in Luft oder anderen Gasen mittels Flammenfaerbung und Vorrichtung fuer deren Durchfuehrung). W. German Pat. 1,133,918. 4p., July 26, 1962. (Appl. Jan. 19, 1961, 10 claims). Translated from German. Franklin Inst. Research Lab., Philadelphia, Pa., Science Info. Services, 7p., Sept. 18, 1969.

The presence of phosphorous- and sulfur-containing compounds in air is determined by spectrophotometric measurements of the coloration of hydrogen flames produced by the injection of gas, which contains oxygen or is mixed with oxygen, in a hydrogen stream. More hydrogen is provided than is necessary for complete conversion of oxygen. The flame coloration is measured in a dark zone at some distance from a first flame where the intensity of the background glow of the flame is negligible over the intensity of flame coloration. Phosphorous compounds are determined in a zone of one to two flame lengths distant from the first flame; sulfur compounds, in a zone five to fifteen flame lengths distant. Equipment required for measurements include quartz or glass capillary tubes; a cylinder for enclosing the hydrogen flame, which is preferably cooled by water; and the spectrophotometer for measuring flame coloration in the spectral range around 520 micron for phosphorous-containing compounds and 380 micron for sulfur-containing compounds.

17024

Fukushima, Tatsuhisa, Mineo Shibano, and Touichi Ohtani

SPECTROMETRIC DETERMINATION OF MASS OF HYDROCARBONS AND NITRIC OXIDE IN AUTOMOTIVE EXHAUST GAS. (Jidosha haiki gasu chu no tank suiso oyobi chisso sankabutsu shitsuryo bunseki). Text in Japanese. Jidosha Gijutsu (Automobile Eng.), 23(4):291-295, 1969. 7 refs.

Hydrocarbons and nitric oxide in automotive exhaust gas contribute to smog formation. Each hydrocarbon molecule type has a different smog formation potential. Mass spectrometric analysis for hydrocarbons and nitric oxide was developed. A continuous hydrocarbon and nitric oxide batch analysis was also established. (Author abstract modified)

17279

Terabe, M.

PREPARATION OF STANDARD DILUTED GAS FOR CALIBRATION BY TEFLON PERMEATION TUBES. (Pamieision chubu ni yoru biryo hyojun-gasu no chosei-ho to oyo). Text in Japanese. Kuki Seijo (Clean Air - J. Japan Air Cleaning Assoc., Tokyo), 6(7):18-21, 1969. 9 refs.

The phenomenon that a liquid gas (sulfur dioxide, nitrogen dioxide, propane, butane) permeates through the tube wall within a teflon tube at a constant rate was studied. The tube had an internal diameter of 0.062 in., a wall thickness of 0.012 in., and an internal temperature of 20.1 plus or minus 0.1 C. The permeation rate of 25 C was 0.58 micrograms/min/cm. By the use of these permeation tubes, a dynamic calibration of automatic SO2 or NO2 measuring instrument, an evaluation of the characteristics of SO2 monitoring instrument, and an adjustment of automatic NOX measuring instruments can be performed.

17341

Yanagisawa, Saburo

INSTRUMENTS FOR MEASURING GASEOUS POLLUTANTS IN AIR --- ESPECIALLY AN AUTOMATIC CONTINUOUS RECORDER. (Taikichu gasujo osenbutsu no sokutei kiki --- shutoshite jidorenzoku sokutei kirokukei nitsuite ---). Text in Japanese. Kogai to Taisaku (J. Pollution Control), 2(9):572-579, Oct. 15, 1966. 3 refs.

Of the harmful elements released into air, dust particles are removed fairly easily by common apparatus. The removal of gases except sulfur dioxide or carbon monoxide, however, is difficult, and little progress has been made. Gas analyzers used in Japan for measuring gaseous pollutants in air include a continuous measurement recorder for sulfur oxides and nitrogen oxides, a continuous automatic recording analyzer for carbon monoxide, and a filter tape harmful gas analyzer. After collection and condensation, the pollutants are analyzed by polarography, gas chromatography, infrared absorption, ultraviolet spectrometry, and mass spectrometry. The recent trend is the use of continuous automatic analyzers because of the high cost of labor. Operating principles and manufacturing companies of the instruments were described in detail.

17368

Guiraud, G. and Y. Berlier

QUANTITATIVE AND ISOTOPIC DETERMINATION BY MASS SPECTROMETRY OF GASEOUS COMPOUNDS PRODUCED DURING DENITRIFICATION. (Determinatio quantitative et isotopique, par spectrometrie de masse, des compose gazeux produits dans la denitirification). Text in French. Chim. Anal. (Paris), 52(1):53-56, Jan. 1970. 8 refs.

Theoretically 'denitrification' is defined as the reduction of nitrates present in the soil to the state of molecular nitrogen. However, in practice, its definition is broader in that it includes the reduction of the nitrates to the gaseous state, except ammonia, by biological or chemical processes. Existing methods of determining the products of denitrification are discussed with respect to their shortcomings. A mass spectrometric method of determining nitrogen and nitrous oxide emitted by the soil in the course of its denitrification is simpler and more rapid than the previous ones. The incubator used in the tests is hermetically sealed and contains a known amount of soil in a pyrex jar which is in contact with an attachment containing a concentrated solution of soda to absorb the CO2 released by the soil. The pyrex jar can be connected by turning a ground cock with a semi-capillary U-shaped tube immersed in liquid nitrogen, in order to trap condensable gase (residual CO2 and particularly N2O). This trap can be shut off by cocks on both sides. In most cases, 20 g of soil saturated with water was used to which 1% of glucose and 15 mg of nitrogen in the form of KN03 enriched 30% by the 15N isotope was added. The incubators were kept at 25 C in an oven and their atmosphere was periodically analyzed by a Varian Mat model GD 150 mass-spectromete The isotope content of the gaseous compounds with two N atoms can b measured in three different ways. The quantitative determination of the amounts of N2O and N2 are described and discussed in great detail and a typical example is given.

17436

Pleschka, K., W. Usinger, and C. Albers

THE DETERMINATION OF THE NITROUS OXIDE CONCENTRATION IN BLOOD AND LIQUOR WITH THE AID OF GAS CHROMATOGRAPHY. (Ueber die Bestimmung der Stickoxydul-Konzentration in Blut und Liquor mit Hilfe der Gaschromatographie). Text in German. Anaethesist, vol. 15-16:166-168, 1966-67. 8 refs.

A method for determining the nitrous oxide concentrations in small blood samples (0.1 to 0.5 ml) by gas chromatography is described. The method combines the vacuum extraction by van Slyke with the sample dispatcher, a four-way cock, by Farhi et al. The reproduceability of the method is better than 0.5%. The method was used for estimating cerebral blood flow and for determining the uptake of nitrous oxide by the cerebro-spinal fluid. Five dogs were anesthetized and the N2O concentration in the arterial blood as well as in the blood of the sinus sagittalis was determined. For an average arterial CO2 tension of 56 torr, the average cerebral blood flow was 46.8 ml/min/100 g and the oxygen consumption of the cerebrum was 3.2 ml/min/100 g. The uptake of N2O by the cerebro-spinal fluid was much slower than in the venous blood.

17452

Lauer, O.

NEW CENTRIFUGAL LABORATORY WIND SIFTER WITH LARGE SEPARATION RANGE. (Neuer Fliehkraft-Laborwindsichter mit weitem Trennbereich). Text in German. Chem. Ing. Tech., 41(8):491-496, April 1969. 2 refs.

A centrifugal wind sifter wind rotating zig-zag channels was developed for grain size analyses. It can be used for grain sizes from 1.5 to 8.0 micron and for materials with a density of 2.7. The unit has throughput of 0.5 to 3 kg/hr. The sifting process comprises of dosing - dispersing and separating the fine and coarse material from the carrier gas. The material which is to be sifted is filled into a wide-necked bottle which is tightly attached to the charging device. The latter consists of a screw conveyer and an agitator. A blower injects about 55 to 60 standard cu m air/hr. The desired sifting range can be adjusted by varying the rpm of the sifting wheel and the air quantity according to a calibration curve. The discriminating effect of the wind sifter and the reproducibility are good. Even material with a strong tendency to agglomerate can be separated.

17664

Sovyanovaky, V., M. Dressler, and J. Janak

CURRENT VOLTAGE CHARACTERISTICS OF SOME TYPICAL THERMO-IONIZATION DETECTOR SYSTEMS. Preprint, Czechoslovak Acad. of Sciences, Brno, Inst. for Instrumental and Analytical Chemistry, 30p., 1968 (?). 14 refs. Translated from German. 32p.

Current voltage characteristics of metal types of thermo-ionization detectors were measured and compared with the characteristics of the solid glass detector. The influence of the complete shielding on these characteristics was determined. The mutual influence of the systems for a combined detector was manifested in all cases by the changes in the size and the character of the signal of the flame ionization detector. These changes were caused by the polarity of the electrodes and the construction, in some cases the material, of the detector. The response signal of the thermo-ionization system of the combined detectors was a function of the distance between the two systems, and the latter was always lower at the same degree of ionization effect than was the case for a simple ionization detector. The fusion temperature of the salt of the alkaline metal was the main factor influencing the current voltage characteristics off the simple ionization detector. A comparision of electrical heating of the fused-salt carrier of the alkaline metal with the heating by means of flames demonstrated that the advantage of electrical heating does not lie in the elevation of the response signal, but rather in the possibility of control of the basic ionization current, independently of the flow of hydrogen. (Author abstract modified)

18226

INVESTIGATION AND APPRAISAL OF FLU-GAS DAMAGE. (Untersuchung und Begutachtung von Rauchschaden. Part I.), Translated from German. Hamburg Staatsinstitut fur Angewandte Botanik Jahresbericht, 5(119-120), 1938. 3 refs.

Plants exposed to flue gas showed definite damage from fluorine (F) and acids of sulfur and nitrogen. A crystalization method utilizing the microscopic identification of silico-sodium fluoride proved best for qualitative fluorine analysis of the 102 samples examined through 1936. As in previous studies, the samples tested showed that F was taken in through the branch bark and leaves of cherries and pears. For the first time, however, the fruit itself was damaged and F detected there. Black, hard disks had formed around the flower and in the fruit adjacent to the flower. Samples examined long after damage took place showed no F present. Twenty-one samples were examined for acid damage. Large concentrations of nitrates were detected in the specimens by means of the diphenylamine-sulfuric acid reaction. Different plant species showed markedly different sensitivities to flue gases.

18306

Sato, Junji

THE RESULT OF OBSERVATION ON PLUME RISE. (Hai Gasu Joshoko No Jisoku Kekka) Meteorological Research Inst., Tokyo (Japan). Applied Meteorology Laboratory, 14p., 1968. 5 refs. Translated from Japanese.

The plume rises from industrial chimneys 55, 90, 120, and 170 meters in height were examined and attempts made to fit the empirical data to existing correlations for dispersion and effective stack height. These were used to describe the spreading pattern of the high-temperature plume as it left the stack, an important factor in determining the pollutant concentration on the ground. Photographs of the tracer-colored plume were taken at 40-second intervals. The axis of smoke flow was observed from a helicopter. Additional observation points on the ground gave sufficient data to calculate trigonometrically the position of the trail. The plume temperature and rise velocity at the stack exit, and the wind velocity, were also determined. The Priestley equation for plume rise was used for the determination of the maximum rise height for heat-dependent, neutral-layered conditions, and for a stable condition. It was found that stacks taller than 100 meters contacted atmospheric layer movements and had practically no unstable condition. Empirical findings were compared with results calculated from the Holland (Oak Ridge), Bosanquet, and Priestley equations. The Holland correlation was satisfactory for large heat emissions, and the Bosanquet equation gave inconsistently high values. The Priestley equation was good for small heat emissions. When empirically corrected for wind velocity, stack height, and heat emission, the correlation gave the plume rise in terms of experimentally determined factors for netrual layer conditions.

19902

Benarie, M. and S. Panof

NOTES ON THE PREDICTION OF SOLID PARTICLES IN SUSPENSION IN A TURBULENT GAS FLOW. (Notes sur le prelevement des particules solides en suspension dans un gaz en ecoulement turbulent). Text in French. Aerosol Sci., 1(1):21-33, 1970. 11 refs.

Experiments were conducted on sampling polydisperse dust particles up to four millimicrons in diameter. The particles were blown down a vertical wind tunnel and sampled at three different kinds of head at velocities that were equal to 0.5, 1.0, and 2.0 times the wind velocity. The relationship between the ratio of the apparent to true concentration and the ratio of sampling to wind velocities was found to agree with a previously reported expression. Isokinetic sampling is essential to obtain correct concentration values; the error is smaller when the sampling velocity is too high than when it is too low. The shape of the head was not important and changes in particle size distribution due to anisokinetic sampling were not detected.

19958

Hisatsune, Isamu C.

STUDY OF GAS PHASE CHEMICAL REACTIONS BY INFRA-RED SCAN MONOCHROMATOR. Kagaku no Ryoiki (J. Japan. Chem.), 23(2): 12-17, 1969. 10 refs. Translated from Japanese. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 18p., May 14, 1969.

The operating principles and applications of the infra-red rapid scan monochromator are described, particularly in its application to the gas phase reaction of nitrogen oxide. A monochromator of the type described can repeatedly record 3-150 spectra per second. It performs most satisfactorily measuring reactions of short half-life time, in the range from 1-60 seconds. Two slightly different units are described; one is commercially available, the other is an experimental device. A reaction cell for mixing the reactants to be studied is described. Several sample reactions are analyzed to serve as examples of the abilities of the method.

19960

Kokhanovich, M. M. and V. G. Morachevskiy

THE POSSIBILITY OF INTERPRETING THE DATA OF A SEDIMENTATION ANALYSIS. Probl. Fiz. Atm., no. 5, 1967. 6 refs. Translated from Russian. Aztec School of Languages, Inc., McLean, Va., Research Translation Div., p. 261-264, 1970. CFSTI: NASA TT F-587

The results of a parallel study of the size distribution of drops of a modeled nebula are presented. The information is obtained by a sedimentation analysis and by the microphotographic method in order to illustrate the advantages of the former. The sedimentation method of analyzing the degree of dispersion of a modeled nebula gives a completely clear and precise representation of the size distribution of the drops in it. It can be used to study natural and modeled clouds and nebulae, and is less cumbersome than the microphotographic method. (Author abstract modified)

20565

Schneider, W.

SIMPLE METHODS FOR SO2 AND SO3 DETERMINATION IN FLUE GASES. (Einfache Methoden zur SO2- und SO3-Bestimmung in Rauchgasen). (Energietechnik, 17 (12):543-546, Dec. 1967. (Presented at the Sitzung des Arbeitsausschusses 'Verfeuerung fester und Fluessiger Brennstoffe', Dresden, Sept. 28, 1966.) Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 15p., Aug. 5, 1969.

The isopropanol or absorption method of Corbett and Flint, the condensation method of the Shell laboratories, and the sodium chloride method are discussed. The equipment for the Corbett-Flint method is illustrated. Only the condensation method determines the SO3 content in flue gas accurately. The NaCl method yields approximate values. The complex sampling and analyzing apparatus for the Corbett-Flint method have no relationship to the low accuracy achieved with this method. Sulfate containing fly dust commonly found in soft coal smoke interferes with the determinations. Sulfur dioxide can be determined at either the condensation or the NaCl method simultaneously with the SO3 by absorption in H2O2 and subsequent acidimetric titration.

20595

Wyszynska, Halina, Konrad Kosinksi, Stefan Maziarka, Z. Misiakiewicz, and Artur Strusinsky

METHODS FOR THE SANITARY INVESTIGATION OF ATMOSPHERIC AIR DEVELOPED BY THE SECTION OF SANITATION LABORATORIES FOR THE PROTECTION OF ATMOSPHERIC AIR. (Metody sanitarnego badania powietrza atmosferycznego opracowanie zespolu Pracowni Sanitarnej Ochrony Powietrza Atmosferycznego). Wydawnictwa Metodyczne Panstwowego Zakladu Higieny (Methodologic Study Govt. Dept. Hyg.), no. 4(26); issue no. 10, 149p., 1968. 78 refs. Translated from Polish. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, Oct. 14, 1969.

Methods are presented for determing atmospheric pollutants, with the exception of carbon monoxide and gasoline, the concentrations of which are defined by Polish law. In addition, methods are given for the determination of pollutants present in the atmosphere in quantities sufficient to create sanitation problems or to cause plant damage and corrosion to buildings. Some of the methods have been checked and tested extensively in the laboratory and in the field. Others have not yet been widely tested but are included for their potential usefulness in laboratory studies. The methods include the measurement of dust collected by the deposition method with respect to tars, sulfates, free silica, heavy metals, calcium, and fluorine. The other methods are the aspiration and contact methods for sulfur dioxide; the method employing thorium nitrate and eriochromecyanin R for sulfur trioxide-sulfuric acid; the para-aminodimethylaniline method for hydrogen sulfide; methylene blue and diethylamine and copper methods for carbon disulfide; the Saltzman method for nitrogen oxides; titration with thorium nitrate and colorimetric determination with eriochromecyanin and zirconium oxychloride for fluorine; o-tolidine for chlorine; titration for hydrogen chloride; buffered potassium iodide and the Heigal method for ozone; the Schryver method for formaldehyde; para-aminodimethylaniline and diazo-p-nitroaniline for phenol; nitration for benzene and chlorobenzene; and the indophenol method for aniline.

20886

Bosch, Robert

METHODS TO MEASURE AIR POLLUTANTS IN EXHAUST GASES OF AUTOMOBILES WITH OTTO ENGINES. (Messverfahren in Bezug auf die Verunreinigun der Luft durch die Absase von Fahrzeugen mit Otto-Motoren). Doc. W/Trans/WP 29/252 of Jan. 16, 1968. 14p. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 24p., Sept. 22, 1969.

A method is proposed for measuring the amount of carbon monoxide and calculating the amount of hydrocarbons in exhaust gases from automobiles with Otto engines. In the method, which simulates driving conditions in heavy city traffic, the automobile is tested on a chassis dynamometer equipped with a brake and a flywheel. Four test cycles lasting a total of 13 min are performed without interruption. Each cycle consists of 15 operating stages (idle, acceleration, cruising speed, deceleration, etc.) in the course of which the exhaust gases are collected in one or more bags. At the end of the sampling time, the gases are analyzed and their volume is measured. Formulas are presented for converting the amount of gas contained in each bag to standard temperature and standard pressure and for computing the amount of carbon monoxide and hydrocarbons in each bag.

20923

Mammarella, Luigi

AIR POLLUTION AND ITS DETECTION. (Inquinamenti dell'aria e loro rilevamento). Rome, Italy, Il Pensiero Scientific Publishing House, June 1966. 214 refs. Translated from Italian. Naval Intelligence Command Headquarters, Washington, D. C., Translation Div., 226p., Sept. 4, 1968.

Data on air pollution indicating its sources, mechanics of diffusion and behavior, and influence on public health and economy were compiled. The most important sampling equipment or materials were described. Air pollutants were classified as aerosols, smoke, fumes, dust, fog, smog, gases, and odors. Tests for airborne pollution included a Guecker's counter, Mumma's aerosol analyzer, Ringelman charts, and a smokescope. Aerosol collection methods discussed were sedimentation containers, deposit gauges, filtration, centrifuging, thermal precipitation, electrostatic precipitation, and impact sampling. Sampling of gaseous or vapor phase pollution was separated into quick and precision methods. Quick methods included the peroxide weighing method and the hydrogen peroxide volumetric method. Precision methods included absorption, adsorption, freezing, and withdrawal of gaseous samples in vacuum containers. Infrared and ionization chamber analyzers were also discussed. Microbic air pollution was described. Vitality, infectiousness, and virulence of the microorganisms, variation in the number of organisms, sources, classifications of the microbe support, behavior and measurement methods were reviewed. The detection methods of airborne microbic contaminants were settling, volumetric sampling, collector funnels, multiple funnel collectors, electrostatic precipitation, thermal precipitation, impaction, impingers, filtration, and chromatic analysis of bacterial particles. Sources of radioactivity reviewed were mineral processing, nuclear reactors, and nuclear explosions. Radioactive air pollution detection methods included settling, filtration, electrostatic precipitation, adsorption and absorption, gas detectors, and solid detectors.

20947

Lampadius, F.

AIR ANALYSES FOR DETERMINATION OF THE FILTRATION OF SULFUR DIOXIDE BY FOREST STANDS. (Rozbory vzdmchu k zjisteni filtrace SO2 lesnimi porosty). Scientific and Technical Society, Prague (Czechoslovakia), Agriculture and Forestry Section, Proc. Conf. Effect Ind. Emission Forestry, Janske Lazne, Czechoslovakia, 1966, p. XIV-1 to XIV-4. (Oct. 11-14.) Translated from Czech. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, April 24, 1969.

The theory of filtration capacity, based on the capability of forests to filter air and smoke damage by means of air analysis, was investigated. The investigation was based on the 'pararosaniline' method using the measuring box (Messkoffer) which is sensitive to the presence of sulfur dioxide in the air. It permits evidence of short-term, very slight variations in sulfur dioxide concentrations by means of short-term sampling of the duration of eight to 10 minutes. The methodology aims at comparing the measurements for an unforested area in front of the forest with results in the interior of the forest obtained at various distances from the smoke emission source in the direction of the wind. The meteorological factors such as direction and velocity of winds, temperature, relative humidity of air, visibility, and cloudiness were taken into consideration. The results obtained show that the sulfur dioxide content inside the forest, and comparatively far from the smoke emission sources, fluctuate greatly. The distribution of these fluctuations over a period of time arise both convectively and advectively; they are often periodic. Assuming a retarded exchange in the above-ground layer of air, the air samples inside the forest showed from time to time higher concentrations of sulfur dioxide in comparison to the free terrain. It is concluded that the filtration capability, so far attributed to forests, does not correspond to the actual state of affairs to the extent so far assumed.

21533

Stratmann, Heinrich and Dieter Rosin

INVESTIGATIONS INTO THE SIGNIFICANCE OF AN EMPIRICAL CHARACTERISTIC MAGNITUDE FOR DESCRIPTION OF THE FREQUENCY DISTRIBUTION OF SO2 CONCENTRATIONS IN THE ATMOSPHERE. Staub (Duesseldorf), 24(12):520-525, 1964. 12 refs. Translated from German. Belov and Associates, Denver, Colo., 11p., April 1, 1970.

An empirical characteristic calculated only from the individual concentrations above the arithmetic mean is used to describe the frequency distribution of sulfur dioxide concentrations. This empirical characteristic, 'so', is identical to the standard deviation, 's', of individual values in the case of normal distribution; however, it deviates more markedly from 's' the more asymmetric the distribution. A comparison between distributions found at 20 measuring places and those calculated from 's' show a statistically valid agreement. The empirical characteristic can therefore be employed to assess a breach of emission limits. (Author summary modified)

21629

Buck, M.

DEVELOPMENT AND TESTING OF A FILTER CARTRIDGE FOR THE ELIMINATION OF DISTURBING INFLUENCES AT THE MEASUREMENT OF SULFUR DIOXIDE IN THE ATMOSPHERE. (Entwicklung und Pruefung einer Filterpatrone zu Ausschaltung von Stoerenflussen bei der Messung von Schwefeldioxid in der Atmosphaere). Schriftenreihe Landesanstalt Immissions- und Bodennutzungsschutz Landes Nordrhein-Westfalen (Essen), no. 6:28-30, 1966. 4 refs. Translated from German. Belov and Associates, Denver, Colo., 10p., April 15, 1970.

A filter cartridge based on the suction principle and consisting of a layer of quartz wool prepared with a solution of Ag2SO4 and KHSO4 was developed to absorb hydrogen sulfide, hydrogen chloride, and ammonia, the substances which interfere most with air quality measurements of sulfur dioxide. The cartridge absorbs the interfering compounds during sample intake almost completely at air throughputs of up to 180 liters an hour without also absorbing the SO2, and is therefore suitable for automatic SO2-measuring devices operating on low air throughput as well as for manual methods. Experiments are reported investigating in further detail the suction of H2S in the filter cartridge and SO2 uptake by the cartridge. When conventional sampling techniques are used for the Silikagel and TCM methods of manual SO2 measurements, SO2 values are not distorted by the filter. Instructions are given for its preparation and installation in the sampling device.

21662

Bersis, D. S.

NEW METHOD FOR THE STUDY OF CHEMILUMINESCENCE AT SIMULTANEOUS FLUORESCENCE. (Ein neue Methode zum Stadium der Chemilumineszenz bei gleichzeitiger Fluoreszeng). Z. Physik. Chem. Neue Folge (Frankfurt), vol. 22:328-335, 1959. 6 refs. Translated from German. Belov and Associates, Denver, Colo., 10p., April 14, 1970.

The apparatus and experimental procedure are described for the simultaneous but separate determination of the chemiluminescence and fluorescence of reactions. With this method, the samples under study are radiated with ultraviolet light impulses from which only monochromatic radiation of wave length 3650 A is filtered. The emissions produced by chemiluminescence, in the form of continual components, and by fluorescence, in the form of superimposed alternating current components, are registered separately and measured by a photostream amplifier which does not receive any ultraviolet light at all, since the excitation line of 3650 A is totally absorbed by additional filtering. The method was applied to experiments on the chemiluminescence of thiocyanate B produced by ozone. In contrast to results in the literature obtained with conventional neutralizing agents, the effect of ozone on thiocyante B in an amylacetate solution produces a blue-green chemiluminescence by a blue-green fluorescence.

21761

Tomizawa, Toshi, Osamu Shimoda, Takayuki Mizuno, Taiji Arai, Teruo Seki, Tyuhei Asakawa, and Ken-ichi Oda

AN ANALYTIC APPROACH TO THE EFFECTS OF ATMOSPHERIC POLLUTANTS OF THE CONDUCTIVITY OF ABSORBING SOLUTION. Electric Central Inst. Foundation (Japan), Engineering Dept., p. 1-18, Technical Experimental Institute Rept. 69022, Aug. 1969. 6 refs. Translated from Japanese. Belov and Associates, Denver, Colo., 26p., April 6, 1970.

An atmospheric pollutant surveyor measures sulfur dioxide by passing the collected atmosphere into a solution containing 0.006% H2O2 and (5 times 10 to the minus 5 power) normal sulfur oxide to produce sulfuric acid. Since there are other components in the atmosphere which may be absorbed and affect solution conductivity, the absorbing solution was analyzed for the presence of the suspected ions and their effect on the conductivity of the solution determined. Ions considered were SO4(--), Cl(-), K(+), Na(+), Ca(++), NH4(+), Mg(++), and NO3(-). Densities of each ion were obtained using ion exchange analysis techniques. A 5% density fluctuation coefficient was observed as a result of the adsorption of these minor constituents. The conductivity ratio of the original absorbing solution was determined to be 24.4 micro-ohms/cm. A difference of 0.4 micro-ohms/cm was observed for the test solution.

22072

Osherovich, A. L. and A. K. Suslov

THE SELECTIVITY OF AEROSOL ATTENUATION IN OZONOMETRIC OBSERVATIONS OVER ZAILIYSKIY ALA TAU. Probl. Fiz. Atm., no. 5. 1967. 25 refs. Translated from Russian. Aztec School of Languages, Inc., McLean, Va., Research Translation Div., p. 224-240, June 1970. CFSTI: NASA TT F-587

A series of parallel electrophotometric observations of atmospheric ozone is described. The experiments are undertaken in an attempt to evaluate different methods of observation of aerosol extinction and in order to improve upon the techniques wherever possible. Simultaneous observations at different altitudes are necessary for a further investigation of the aerosol correction. A comparison of the data should be carried out with narrow light filters and instruments of the same type, since in the opposite case the Forbes effect greatly decreases the accuracy.

22079

Just, Jan, Stefan Maziarka, and Halina Wysznska

A COMPARATIVE STUDY OF THE MEASUREMENT OF ATMOSPHERIC AIR POLLUTION BY THE ASPIRATIONAL AND SEDIMENTATION METHODS. (Badania porownawaze zapylenia powietrza atmosferycznego metoda aspiracyjna i sedymentacijna). Roczniki Panstwowego Zakladu Higi., 19(6): 641-651, 1968. 11 refs. Translated from Polish. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 17p., Oct. 23, 1969.

Systematic measurements of dust pollution were conducted simultaneously by the aspiration and sedimentation methods in 10 Polish cities during 1966 and 1967. The aspiration method is based on the day-long aspiration of air through a glass fiber filter; the concentration of dust is determined by the difference in weight of the filter before and after collection. In the sedimentation method, glass jars are exposed for a month and the dustfall is weighed after washing and drying. The distributions of the measurements indicated a rather close relationship between the two sets of measurements obtained by each of the two methods. Equations are presented by means of which measurements obtained by either method can be converted to results which the other method would have yielded. They can also be used to approximate the concentrations of atmospheric dust in a city from available dustfall data. The dust concentrations in the cities studied were highly correlated (the correlation coefficient equalled 0.78), indicating that the ratio of the amounts of relatively precipitable dusts to suspended dusts in large cities is comparatively stable. Distinct differences in the chemical composition of dusts, depending on the degree of dispersion, were found. The steadily sedimenting dusts contain significantly smaller quantities of benzene-extractable substances and lead compounds as do suspended dusts.

22220

Bartovsky, T.

AUTOMATIC ANALYSIS OF GASEOUS IMPURITIES IN THE ATMOSPHERE. (Samocinne amaluzatory plynnych necistot v ovzdusi). Ochrana Ovzdusi, 1969:129-135, Sept. Translated from Czech. Belov and Associates, Denver, Colo., 23p.

Tables are presented which show a summary of the current developments in automatic analyzing instruments used for concentrations of pollutants in the atmosphere or in industrial stack gases. The list of manufacturers is based on the principle on which the function of the instrument is based. Instruments based on absorption of infrared radiation can be used to measure carbon monoxide and dioxide, nitrogen oxides, ammonia, sulfur dioxide, hydrogen chloride, and hydrocarbons. For determining very low concentrations of compounds in gas mixtures, a combination of photometric analysis and the reaction of the gas and liquid is used. Instruments based on the electrolytic conductivity change of liquids after reaction with glass are also suitable for measuring low concentrations in gas mixtures. Depolarization and polarographic instruments use the electrochemical reaction on the polarized electrode immersed in the liquid. In coulometric instruments, the compounds are electrolytically oxidized with bromine or iodine. This method is used to measure SO2, hydrogen sulfide, mercaptans, thiophenes, thioethers, organic sulfides, and olefins. For measuring high concentrations, the election of instruments for each compound is broad and the selection of the most suitable instrument depends on other conditions, especiall on the type of other impurities.

22391

Sakai, Kaoru, Fumio Mizuniwa, and Yasuji Hayashi

MEASUREMENT AND BEHAVIOUR OF EXHAUST GAS IN POWER PLANT. (Karyoku puranto haigasu no sokutei to kyodo). Hitachi Hyoron, 49(11): 1138-1142, Nov. 1967. 19 refs. Translated from Japanese. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 23p., Oct. 29, 1969.

In purifying exhaust gas in power plants, the development of desulfurizers and electric precipitators is being stimulated, but it requires a reliable method of analysis for gas ingredients. Mechanisms for the evolution of sulfur dioxide and sulfur trioxide are discussed. Volumetric methods for analysis of total sulfur, SO2 and SO3 include the neutralization process, the thorin process, and the arsenazo III process. Also discussed is the formation of nitrogen oxide and its measurement. Attempts to increase the reliability of methods for testing sulfur dioxide and trioxide, nitric oxide and nitrogen dioxide, and water are presented. The results of measurements in actual plants carried out according to the methods described or with a dew point indicator are summarized. Some observations on operating variables within the power plants are included. (Author abstract modified)

22626

Materna, Jan and Ludmila Ryskova

CONTRIBUTION TO THE BIOCHEMICAL FUNDAMENTALS OF HARTEL TURBIDITY TEST. (Prispevek k poznani biochemickych zakladu Hartelova zakaloveho testu). Lesnictvi, 7(4):389-400, 1961. 15 refs. Translated from Czech. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 22p., Nov. 4, 1969.

An extract from spruce needles was analyzed to characterize in detail the substances causing turbidity of the extract. The extract contained a number of mineral substances such as calcium, magnesium, potassium, silicon, iron, phosphorus, and sulfur. The organic substances present were tannides, carbohydrates, nitrates, pektins, polysaccharides, and substances soluble in ether. During the extraction of needles injured by smoke, the extract received all these substances in higher amounts than when processing healthy needles. A correlation was established between the amount of extracted sulfur and ashes and light absorption by the extract. Increased extraction of tannides from the smoke-damaged needles can be utilized as a new qualitative test to determine the effect of smoke on spruces. The turbidity itself is formed by a mixture of compounds comprising ashes, ether extractable substances, polysaccharides, proteins, traces of pektins, polyphenols, and dyes. The Hartel turbidity test is a simple method for determining the effect of smoke on spruce and delineating the area under attack. The test was analyzed in detail, its nature partially elucidated, and another simple method worked out for orientational determination of the effect of smoke on the assimilation organs of spruce. This test is based on the different degrees of extractability of tannides from healthy needles and from needles exposed to sulfur dioxide. The test requires no special laboratory equipment. (Author conclusions)

22982

Degtev, O. N. and G. M. Karagodin

THE ADVISABILITY OF USING CHROMATOGRAPHY TO DETERMINE UNBURNT GASES. Thermal Eng. (English translation from Russian of: Teploenergetika, 16(12):53-57, 1967. 19 refs.

The loss due to unburnt gases is determined by analyzing flue gases with a GKhP-3 or VTI-2 apparatus, or with chromatographic or titrimetric gas analyzers. The choice of method is governed by the required accuracy of determination as well as by the minimum loss reliably recorded. Errors in determination result from errors in gas analysis, in calculating flue gas volume, and in calculating the calorific value of the fuel. Expressions are derived for calculating the errors of determination for the different gas analyzers and for establishing with adequate reliability the recorded minimum value of the concentration of components under determination. Allowable errors of determination are also calculated for different types of fuel. Based on a comparison of these values with the errors of determination by the different methods, the preferred analyzer for each type of fuel is determined. Use of a chromatograph is recommended for anthracites and coals.

22998

Pfeifer, R. J., B. Y. Cho, and O. L. Utt

MERCURY SUBSTITUTION--NUCLEONIC DETECTION INSTRUMENT FOR SULFUR DIOXIDE MEASUREMENT. ISA (Instr. Soc. Am.) Trans., 9(1):9-16, 19 1 ref. (Presented at the Instrument Society of America, Analysis instrument Division, National Symposium 15th, May 6, 1969.)

In the future, stack gas monitors for sulfur dioxide may be require to demonstrate compliance with federal regulations, and such monitors may become integrally associated with control systems such as scrubbers. For application in power plants and heat-generation facilities, a potential stack-gas monitor must be reliable and easily maintainable, reasonably accurate and free from errors due to contaminants, and of simple construction. The Gas sampling procedure must be such that sulfur dioxide in the gas under test is not altered by sampling conditions. A sulfur dioxide measuring instrument based on a mercury substitution and nucleonic detection (MSND) technique provides these four desirable features. The instrument is characterized by a stoichiometric substitution of mercury for sulfur dioxide in a reaction cell, transfer of the mercury to a measurement cell, and measurement of the mercury by low-energy X-radiation absorption. Construction of the instrument is simple and the disposable reaction cell is charged with reagents for 10-day operation. Measurement accuracy is excellent due to the stoichiometric substitution which is unaffected by interfering substances. Since the mercury substitution occurs in an aqueous medium, the gas sample need not be freed of water vapor and particulates. Total response time, as determined by the sizes of reaction and measurement cells and fluid flow rate, is approximatel 15 min.

23040

Dutkiewicz, Tadeusz, Jerzy Konczalik, and Maria Przechera

ASSESSMENT OF THE COLORIMETRIC METHODS OF DETERMINATION OF CHROMIUM IN AIR AND URINE BY MEANS OF RADIOISOTOPE TECHNIQUES. Acta Pol. Pharm. (English translation from Polish of Acta Pol. Pharm.), 26(2):168-176, 1969. 5 refs. CFSTI: TT 69-50004/2

An evaluation of the colorimetric methods of determining chromium in air and urine based on the reaction of Cr(6+) with diphenylcarbazide was carried out, using radioisotope techniques as the comparative method. Recovery of chromium from solid absorbers is not complete because of the reduction of Cr(6+) to Cr(3+) and may be a source of errors in analysis. It is recommended to do the washing-out with cold water and, simultaneously, to carry out the calibration of the method from the moment of introduction to the absorbers the known quantities of chromium. Oxidation of chromium in urine samples occurs with the same yield, irrespective of the quantity of chromium. The colorimetric method of chromium determination in urine is of the same order as aqueous solutions, and therefore is suitable to the hygienic investigations for the evaluation of exposure to chromium compounds under industrial conditions. (Author absbract modified)

23069

Kudryavtsev, S. I. and N. I. Tonkopiy

METHODS OF EVALUATING THE BACTERIAL SEEDING OF ATMOSPHERIC AIR. Lab. Delo, no. 3:164-168, 1968. Translated from Russian by J. Sechovicz, Foreign Technology Div., Wright-Patterson AFB, Ohio, Translation Div., 7p., Feb. 20, 1970. CFSTI, DDC: AD 704014

The possibilities of using bacteria-collecting equipment for estimating the bacterial seeding of atmospheric air at various air movement speed were examined and a device for precision isokinetic aerosol sampling was developed. Results of studying the effectiveness of the bacteria-intercept devices at various air velocities in a wind tunnel are summarized in tabular form. The majority of the devices were unsuited to isokinetic sampling, since aerosol particles precipitated on the end-face of the tunnels of the intake sections of the devices. This shortcoming is eliminated in a sampler having tubes with chambered edges, a clamping device for filters, and whose capture of aerosol particles is a function of the position of the inlet apparatus in relation to the direction of wind movement in the tunnel. Collection efficiencies of the sampler at various intake positions for particles of different dispersities are tabulated.

23209

Ishchenko, G. N. and K. Khamrakulova

IMPORTANCE OF CULTURE MEDIUM COMPOSITION IN DETERMINING MICROBE CONTAMINATION OF AIR. Med. Zh. Uzbekistana, no. 2:48, 1963. Translated from Russian. Foreign Technology Div. Wright-Patterson AFB, Ohio, Translation Div., 2p., Feb. 20, 1970. CFSTI, DDC: AD 704018

Results are presented of the number of microorganisms in 1 cu m of air as determined, respectively, with the Krotov device and by the the jar-cap method on different agar media. The amount of growing colonies was several times greater in seedings taken by the jar- cap method than with the Krotov device. Colonies from the air seedings obtained by both methods grew least of all on simple agar. When the jar cap method and sugar agar were employed, the number of colonies increased 1.5 to 6 times. The best results were obtained on agar with rabbit blood.

23265

Sugano, Saburo, Shozo Fukui, Shoji Naito, and Mikihiro Kaneko

REACTION OF NITROGEN OXIDES WITH AMMONIA AND AMMONIUM HYDROXIDE. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 2(1):98-100, 1967. Translated from Japanese. 8p.

The reaction between nitrogen oxides and ammonia and ammonium hydroxide was studied. The validity of the equation 2NO2 plus 2NaOH yields NaNO2 plus NaNO3 plus H2O was confirmed by determining the NO2 and NO3 ions in solution. It was also confirmed that NH4OH reacted with NO2 as expressed by 2NO2 plus 2NH4OH yields NH4NO2 plus NH4NO3 plus H2O. However, gaseous NH3 reacted with NO2 as shown by 2NO2 plus 2NH3 yields NH4NO3 plus N2 plus H2O. This reaction was rapid and exothermic and was useful for the removal of NO2. Although NO did not directly react with NaOH or NH3, its air oxidation in the presence of NaOH or NH3 proceeded as follows: 2NO plus O plus 2NaOH yields 2NaNO2 plus H2O or 2NO plus O plus 2NH4OH yields NH4NO2 plus N2 plus 3H2O. In this case, reactions with NaOH and NH4OH produced different mols of NO2 ion. On oxidizing the mixture of NO2 and NO in the air and collecting it in alkali, if a NaOH solution was employed, 1 mol of NO2 produced 1/2 mol of NO2 ion and 1 mol of NO produced 1 mol of NO2 ion. Thus it was impossible to determine the total quantity of NO2 plus NO unless one of the two gases was determined by using some other method. However, on collecting in an NH4OH solution, 1 mol of either NO2 or NO produced 1/2 mol of NO2 ion, so that twice the quantity of NO2 ion was equal to the quantity of NO plus NO2. Based on this experimental result, the NH4OH solution was adopted as the collecting solution for NO2 plus NO in the standard method of determining NO and NO2 in flue gas described in Japan Industrial Standards.

23982

Baum, F. and W. Brocke

DEVELOPMENT OF A SIMPLE METHOD FOR MEASURING THE DUST, SOOT, AND TAR EMISSION FROM A HOUSE FURNACE USING SOLID FUEL. (Entwicklung einer einfachen Methode zur Messung der Staub-, RuB- und Teeremissionen aus Hausbrandeinzeloefen fuer feste Brennstoffe). Landesanstalt fuer Immissions- und Bodennutzungsschutz des Landes Nordrhein-Westfalen, Essen, 1-13, 1968. 12 refs. Translated from German. Belov and Associates, Denver, Colo., 26p., Sept. 24, 1970.

In order to measure emissions from coal furnaces outside the laboratory, a simple, easy to operate measurement method is necessary. To fill this need, the National Institute has developed a procedure derived from the filter paper method. The sampling is done by an automatic measurement appartus. In short time intervals, colored spots are put on filter paper quasi-continuously Alterations in the spots characterize the course of the burning and the amount of discharge. This instrument is an instrument customarily used to determine the soot output of oil burners; it has been altered to suit the present requirements. One provision for its use with coal furnaces was a shortening of the sampling period for each filter spot by more than 90%. The filter spots obtained in experiments with coal furnaces were, however, not only grey to black colored, but also had tones of yellow to brown, as well as mixtures. An evaluation of the filter spots by the comparison scale for oil burners was not possible. On these grounds a two dimensional comparison scale was developed which was built up from a soot comparison scale and a tar comparison scale. It contains not only the pure colors, but mixed colors obtained in measurements. The whole scale consists of 120 by 20 mm comparison fields. Each comparison field is ordered vertically and horizontally (letter and number). Each comparison field corresponds with a count. All of the filter spots are evaluated during a burning period using the comparison scales by averaging the corresponding measurement counts. The average emission values F (average concentration in the exhaust gas during the smoke development period) and E' (discharge related to the calories given off) can be contained. Measurements on coal furnaces show that for most practical cases the results correspond to the emission count of house furnaces. This is shown through comparison with other measurement methods. The experimental material under consideration makes possible the determination of emission limits for house furnaces at this type. (Author summar modified)

25574

Iinoya, Koichi and Akihiro Yamanaka

EXPERIMENTS ON ANISOKINETIC SAMPLING ERRORS FOR SOLID-LIQUID TWO-PHASE FLOW. (Koeki nisoryu ni okeru hitosoku sampuringu gosa no jikken). Text in Japanese. Kagaku Kogaku (Chem. Eng.), 34(1):69-74, 1970. 9 refs.

The deviation in measurement of aprticle concentration due to anisokinetic sampling is experimentally evaluated for solid-liquid flow (water-glass beads two phases), where the necessary uniformly sized particles are easily available. The experimental results are numerically presented and an empirical equition is proposed in whic the ratio of sampling to main flow concentrations depends on the ratio of sampling to main flow velocities and an experimentally obtained gradient coefficient. The results are also compared to previous experimental results and other semi-theoretical formulae for the solid-gas two-phase flow. It is evident that the anisokinetic sampling errors for solid-liquid flow are nearly half those for solid-gas flow, and that Watson's equation agrees fairly well with the results of the present experiment. On the other hand, the anisokinetic sampling errors depend on which definition of mean particle diameter is used for the inertial parameter.

25921

Baum, Fritz, Werner Brock, and Hartmut Brell

THE MEASUREMENT OF EMISSIONS FROM SOLID FUEL HEATING UNIT. (Die Mabtechnische Ergassung der Emissionen aus Hausbrandofen fur feste Brennstoffe). Gesundh. Ingr., no. 10:295-306, 1969. 17 refs Translated from German. Belov and Associates, Denver, Colo., 33p., Dec. 2, 1970.

The quantities and qualities of substances emanating from home heating units depend upon the fuel used, the type of heating unit, and the method in which it functions. Typical emissions include soot, tar, carbon oxides, sulfur oxides, and hydrogen sulfide. Measurements tend to be difficult due to the variety of emissions involved, but several methods are described and evaluated. Electrostatic precipitators, smoke density gauges, filter papers, and gravimetric tedchniques are included. A test situation is described with sampling by the filter paper method, condensation trays for the gravimetric determination of exhaust quantities, and silica gel tubes for determination of carbon emissions. Results are discussed.

26127

Yuu, Shin-ichi and Koichi Iinoya

ON SEPARATION MECHANISM OF TWO-DIMENSIONAL CASCADE IMPACTOR. (Nijigen kasukedo, inbakuta no bunri kiko). Text in Japanese. Kagaku Kogaku (Chem. Eng.), 33(12):1265-1271, Dec. 1970. 9 refs.

The separation mechanism of the two-dimensional cascade impactor wa studied with a combination model of potential free stream and stagnation flow. Like the circular impactor, the two-dimensional cascade impactor has a slit nozzle; the latter collects more particles, however, although separating them at a slower rate. In fluid flow, gas velocity distribution depends on the free stream line at a point distant from the center of the collection plate; in stagnation flow, it depends on a point near the center. With the model used, the trajectory of boundary particles gives the target collection efficiency and the effective area of the collection plate. The same calculation for various points of the nozzle leads to each point on the surface of the collection plate. From differential calculation of the measured points the distribution of collected particles is obtained. Calculated target collection efficiency, collection area, and distribution of collected particle are compared with experimental results. In the experiments, two impactors were connected, the first stage having the larger two- dimensional nozzle. Particles collected at each stage were determined from microphotographs.

27131

Blyum, I. A. and D. P. Shcherbov

ESTIMATION OF THE SENSITIVITY OF FLUORIMETRIC DETERMINATION. J. Anal. Chem. USSR (English Translation from Russian of: Zh. Anal. Khim.), 22(4):584-589, May 1967. 15 refs.

The sensitivity threshold of fluorimetric determinations is set by two independent values--the 'instrumental' and 'analytical' sensitivity thresholds. A method is suggested for computing these values and assessing them experimentally. Based on the application of the method to fluorimetric determination of basic dyes, the sensitivity of a determination can be improved by reducing the analytical threshold through improvement of the stages involved in chemical preparation of reagents. Equations are given for choosing optimum conditions for any reagent or for making a comparison between reagents of the same type. In general, the value of the analytical threshold is approximately proportional to the ratio of the analytical background and calibration factor. (Author abstract modified)

27517

Endo, Ryosaku, Tatsunori Oyake, and Tetsutaro Kohgo

STUDIES ON THE STANDARDIZATION FOR THE MEASUREMENT OF AIR POLLUTANTS. PART I. ON THE DYNANIC CALIBRATION OF SO2 ANALYZER AN ITS INTERFERING FACTORS WITH THE MEASUREMENT OF SO2. (Taiko osenshitsu sokuteiho no hyojunka ni kansuru kisoteki kenkyu. Dai 1 ho. Aryusan gasu jidosokutei sochi no doteki kentei narabini sokutei bogai inshi ni kansuru kenkyu). Text in Japanese. Hokkaido Ritsu Eisei Kenkyushoho, no. 20:191-200, June 1970. 6 refs.

The electroconductivity analyzer for analysis of sulfur dioxide was calibrated dynamically by standard low concentration of sulfur dioxide to be generated from Teflon permeation tubes. The wWest- Gaeke method too was calibrated by the same method. The permeation tubes were placed in the calibration apparatus, in which the temperature was controlled at 25 plus or minus 0.1 C. Periodically the permeation tubes were rapidly weighed with a semimicro balance. The weight loss of the tubes per minute was almost constant. The average values of the SO2 concentrations measured by the electroconductivity analyzer were reduced by 1.9-3.4% from the average values for the tube computed from the gravimetric data. Th average values of the SO2 concentrations measured by the West-Gaeke method were reduced by 1.3-4.0% from the gravimetric calibration for the tube. When the humidity was less than 20%, the adsorptions of the new glassfiber filters for SO2 (Gelman A type) were larger than any other fiber papers. The new glassfiber filters adsorbed 22.4% in 0.2 ppm of the SO2 concentrations, but by using continuously, the adsorption of glassfiber filters was reduced gradually. The filter papers (Toyouroshi No. 1) adsorbed about 10% and Whatman No. 4 about 2% in 0.2 ppm of the SO2 concentration. The adsorption of new filter papers was almost the same as older filter papers. Their adsorption rates were lower in the high concentration than in the low concentration in the case of three kinds of filters. When the humidity was 60%, the adsorptions of the new glassfiber filters, (Gelman A type) for SO2 were markedly large. They adsorbed 60.4% in 0.1 ppm of the SO2 concentration, 44.6% in 0.2 ppm and 27.2% in 0.5 ppm. The new Toyouroshi No. 1 and Whatman No. 4 adsorbed about 10%. Their adsorption rates were higher in high humidity than in low humidity. The adsorption of Teflon pipes was lower than any other kind of pipes. In low humidity, glass pipes adsorbed almost the same degree as Teflon pipes, but in high humidity, glass adsorbed 15-24% of the SO2 concentration. Teflon was no influenced by humidity. The vinyl chloride pipes did not adsorb, but increased the measurement values The interfering substances with the measurement by the electroconductivity analyzer were generated from the new vinyl chloride pipes. The measurement values were higher than the real values, according to a loss in quantity of absorbing solution by babbling. In the case of low humidity, low adsorbing solution, and abundant air flow, this error was increased.

27542

Kurabayashi, Toshio, Tetsuya Nakazawa, and Takao Karasawa

ON MEASUREMENT OF SMOKE DENSITY BY THE PAPER FILTERING SMOKE METER AND THE DETERMINATION OF CARBON QUANTITY. (Roshishiki haiki nodokei niyoru haiki nodo no sokuteiho to kabon no teiryo nitsuite) Text in Japanese. Jidosha Gijutsu (Automobile Eng.), 24(4):341-346 April 1970. 6 refs.

The process of smoke-particle deposition on filter paper was theoretically analyzed. The theory of probability was applied to calculate the white area when a certain amount of carbon particles had been deposited on the filter. The relation between the meter reading and the white area percentage was obtained and was employed to derive a formula giving the amount of carbon from the meter reading. To check the validity of the theory, an experiment was conducted using a steady-smoke generator and photoelectric color meter. Smoke was produced by the incomplete burning of propane. A diagram of the sampling apparatus is shown, as is a sample holder design. Six kinds of filters were employed to catch the carbon particles. The thicker the filter, the more stable the light reflection. The derived formula was valid. The carbon content of the combustion gas was quantitatively determined by the meter reading if the carbon concentration on the filter was within a certain range. Beyond this, the error increased rapidly. The effect of filter characteristics on the meter reading was inconsiderable. The Bosch smoke meter was chosen as a typical, commercially available meter of the filter paper type. It was checked by the photoelectric color meter; correlation was satisfactory.

28070

Vol'fson, V. Ya. and A. F. Sudak

CHROMATOGRAPHIC DETERMINATION OF CARBON DISULFIDE, CARBON DIOXIDE, AND SULFUR DIOXIDE MICROCONTAMINANTS IN AIR (EXCHANGE OF EXPERIENCE). Ind. Lab. (USSR) (English translation from Russian Zavodsk. Lab.), 36(9):1322-1323, Sept. 1970. 6 refs.

Trace concentrations of carbon dioxide, carbon disulfide, and sulfu dioxide in air were quantitatively determined by chromatography wit a thermal conductivity detector silanized. Chromosorb G, cooled in a hydrogen current and impregnated with sebacic acid dinitrile, was used as a support. In the column, the sorbent was previously treated with a mixture of $SO2$ in air for 2-3 hr at 35 C. Separation was carried out at 35 C, with a hydrogen gas carrier flow rate of 80 ml/min, and a bridge current of 180 mA. The sample was enriched by first freezing the components of the mixture (-183 deg) in a concentrator. The minimum determinable amounts of substances by this method are as follows: $CO2$, 0.0001; $CS2$, 0.0005; and $SO2$, 3 times 10 cu cm.

28165

Kamiyama, Hiroaki

RELIABILITY OF THE METHODS FOR MEASURING SULFUR DIOXIDE IN THE ATMOSPHERE. (Taiki chuno nisanka iou sokuteiho ni kansuru shinraisei nitsuite). Text in Japanese. Bunseki Kagaku (Japan Analyst) (Tokyc), 19(11):1601, Nov. 1970.

The disagreement between sulfur dioxide values obtained with an air pollution (AP) meter and the rosalinine method was studied. A high-recision, large-scale standard gas generator and a condenser-collector of polluted air were designed and built for a microanalysis of pollutant components. The gas generator prepared $SO2$ concentrations of 0.05-0.20 ppm with an accuracy of 95%, or within the plus or minus 0.02 ppm confidence range. The sulfite standard rosalinine method gave an $SO2$ value 10% lower than the AP meter. Nitrogen oxides up to 0.2 ppm, carbon monoxide up to 40 ppm, and hydrochloric acid up to 0.2 ppm did not affect the AP reading. No differences in AP values due to location were observed in field tests, nor did the effect of atmospheric salt depend on locality. The effect of salt on AP meter readings was about 0.01 ppm. No other components of air affected meter values except ammonia, which lowered the value. It is concluded that the higher $SO2$ value measured with the AP meter is due to the loss of the absorbent in the meter.

28291

Oura, Masahiro and Motoo Komagata

NON-DISPERSIVE INFRARED ANALYZER. (Hibunsankei sekigaisen bunseki kei). Text in Japanese. Denshi Kagaku (Electronic Sci.), 21(2):23-27, Feb. 1971. 5 refs.

The non-dispersive infrared analyzer was developed for industrial applications but has recently been widely used in the quantitative analysis of automobile exhaust fumes and industrial waste gases. It utilizes measurement of the molecular dipole moment to determine the amount of infrared energy absorbed by a gas sample. The use of such physical phenomena provides rapid response, high selectivity, and simple maintenance. Applications of the NDIR analyzer include the determination of carbon monoxide and carbon dioxide in air; carbon monoxide, nigrogen oxides, and hydrocarbons in automobile exhaust gases; and sulfur dioxide in stack gases. By comparison to the NDIR, a dispersive-type infrared analyzer has a complicated optical system and is not effective for long-term analysis. Two basic forms of the NDIR are the negative filter type and positive filter type. The former has a nonselectiv detector while the latter is selective with respect to specific wave lengths for specific sample gases. Brief discussion is provided concerning the condenser microphone used as a detector for in the positive filter NDIR. The noise elimination characteristics of the two common amplifiers used are compared. Response time of detectors are insignificant in contrast to the response time of indicator devices. The linearity of output and the automatic calibration circuitry are also discussed.

28296

Konosu, Hisao, Masato Sato, Ayu Nakajima, and Yoshihisa Omori

TRIAL CONSTRUCTION OF A NON-DISPERSIVE TYPE VACUUM ULTRAVIOLET PHOTOMETER AND ITS APPLICATION TO GAS ANALYSES: (Hibunsangata shiku shigai kodokei no shisaku to gasu bunseki eno oyo). Text in Japanese. Preprint, Inst. for Disaster Prevention (Japan), 2p., 1971. (Presented at the Disaster Prevention, Chemistry Meeting, 11th, Japan, Jan. 22-23, 1971.)

Design and performance data are reported for a nondispersive photometer which permits the continuous quantitative determination of a sample gas. The instrument measures the absorption intensit of the sample gas in the vacuum ultraviolet range and compares it to that of the reference gas (nitrogen). The photometer has an evacuated optical system. The ultraviolet light from the light source (a deuterium discharge lamp) is cut off by the combination of a concave grating and exit slit, so only vacuum ultraviolet light (165-20 nm) passes through the gas cell. The transmitted light is made visible by a thin fluorescent film and then detected by a photomultplier. Performanc tests show that the photometer performs satisfactorily as a continuous analyzer and accurately determines inflammable components in volatile gases. Allowable concentrations or explosion limits of many gases can be detected by this device, which has applications for safety control or process control in manufacturing.

28300

Kimura, Shigeyuki

DISPERSION TYPE INFRARED ANALYZER. (Bunsankei sekigaisen bunsekikei). Text in Japanese. Denshi Kagaku (Electronic Sci.), 21(2):15-22, Feb. 1971.

A dispersive type infrared analyzer is discussed with reference to its photometric system, electronics for signal processing, and the introduction of infrared absorption spectrum. The signal processing system differs according to the time-scale of observed or analyzed phenomena: the analysis stationary or slowly proceeding phenomena is the subject of this paper. There are two essential types of monochromatic devices, and others are variations of them: monochrometer is an independent device dividing an infrared ray into its energy or wavelength, another is a detector with the ability to select rays. The analyzer operates to divide the infrared ray from the light source, by mirrors, into sample and reference ray bundles. After their absorption in corresponding cells, these are sent alternatively to the monochrometer and are detected. The differenc in light intensity at a certain wavelength causes an alternating current in the detector, the frequency of which is determined by the revolutional speed of 2 perforated mirror disk gating the absorbed rays. The alternating signals are emplified and rectified to be modulated for a servo-motor. The motor is connected to an optical attenuator controlled to give the same intensity as each ray. The change of optical attenuation is recorded to give the absorption. A gas analyzer usually has two light source and not mirrors. The gas generally expands with the absorption of an infrared ray, and the change of the gas volume is measured as the change of capacitance. The design of the pre-amplifier depends on the type of detector used. The pre-amplifier is essentially a noiseless amplifier giving low impedance. The amplification of the main amplifier is 40-80 dB, and the frequency band selected is that of the chopper of absorbed ray for cutting off noise. Several problems in the design of amplifiers and rectifiers are cited. Two analyzers with different monochromatic devices are compared in terms of signal processing.

28450

Polozhayev, N. G., V. V. Girina, and T. Ye. Laktionova

MICROMETHODS OF DETERMINING HARMFUL SUBSTANCES IN ATMOSPHERIC AIR. (Mikrometody opredeleniya vrednykh veshchestv v atmosfernom vozdukhe). Text in Russian. Gigiena i Sanit., no. 8:15-20, 1951.

Microanalytic nephelometric and colorimetric methods for determining a number of air pollutants are described. Detection sensitivities are as follows: chlorine, 0.002 mg; hydrogen sulfide 0.0002 mg; sulfur dioxide, 0.002 mg; lead, 0.001 mg; and mercury, 0.00005 mg. Air microsamplers are also described.

28585

Lyando, R. E. and B. I. Vasil'ev

CHROMATOGRAPHIC METHOD OF COMPLETELY AUTOMATIC ANALYSIS OF FLUE GASES. Thermal Eng. (English translation from Russian of: Teploenergetika), 16(9):70-73, Sept. 1969. 3 refs.

A chromatographic system is described that permits the automatic analysis of the complete composition of flue gases. The system uses one instrument for the analysis of combustible components (hydrogen, carbon monoxide, and methane) and another for determining incombustible components (oxygen and carbon dioxide). Complete separation of combustibles takes place in one column filled with activated carbon. The other instrument has one detector but several columns connected in series, including two filled with molecular sieves. By removing nitrogen from the system the molecular sieve columns reduce the analysis of incombustible components to 4-4.5 min. Under optimum conditions, the sensitivity threshold of this instrument with respect to oxygen is 0.75%. The other instrument has a sensitivity of 0.008% for methane, 0.015% for carbon monoxide, and 0.001% for hydrogen. Analysis requires 4.5 min. Both instruments performed satisfactorily when tested under industrial conditions at a power station.

29269

Laffort, Paul

BIVALENT RELATIONSHIP BETWEEN THE OLFACTORY THRESHOLDS OF 50 PURE SUBSTANCES AND SOME OF THEIR MOLECULAR PROPERTIES. (Relation biunivoque entre les seuils olfactifs de cinquante corps purs et certaines de leurs proprietes moleculaires). Text in French. Compt. Rend. Soc. Biol. (Paris), 162(2):1704-1712, July-Dec. 1968. 12 refs.

A mathematical formula is derived from a study of 50 substances, mostly organic, which permits the calculation of the olfactory threshold in man from certain physicochemical data. The important parameters in the equation are the apolarity (A) derived from the molecular volume, the hydrogen bond index (H), and the volumetric polarizability of the octet. The group of 50 substances examined includes aliphatic hydrocarbons, common alcohols, some esters of ethyl alchol, common organic acids, ammonia, bromine, carbon disulfide, and hydrogen sulfide.

29436

Kiyoura, Raisaku, Hiroshi Mizusawa, Kunio Imai, Haruo Kuronuma, and Yoshisuke Uenishi

REVIEW OF DIRECT MEASUREMENT METHOD OF SULFURIC ACID MIST IN ATMOSPHERE. (Taiki chu no ryusan misuto no chokusetsu sokuteiho no kento). Text in Japanese. Preprint, Japan Chemical Society, Tokyo, 1p., 1971. 1 ref. (Presented at the Japan Chemical Society Annual Meeting, 24th, Tokyo, March 1971, Paper 3406.)

The establishment of a measurement method for sulfuric acid mist, has been desired. So far, such methods as trapping sulfuric acid mist with filtering paper, measurement of the electrical conductivity of the liquid, or diffusing, have been reported, but none a selective, accurate quantitative analysis, or simple to handle. An attempt was made to trap the dust containing sulfuric acid mist by dry impinger method. The method adopted by Scaringelli et al. was reviewed, and the modified method has been proposed. After dried nitrogen gas is let through fuming sulfuric acid, and is contacted with the air, with a certain steam pressure, the sulfuric acid mist is generated. It is then let in the device connecting the dry impinger and filter. The slide set under the nozzle of the impinger impacts and traps sulfuric acid mist. The untrapped mist is trapped by the filtering paper later. The trapping effectiveness of the impinger was checked, by changing the nozzle diameter, di, of the impinger, distance between nozzle and slide, dis; concentration of SO3, C; steam pressure, P; and velocity, V. As a result, under the condition of di equals 0.25 cm, dis equals 0.1 cm, C equals 3 ppm, P equals 1 Omm Hg, V equals 10 l/min, the effectiveness was about 90%. Therefore, this method will do, as a simple trapping method. A glass fiber slide was used but a check is being made on copper plates. The dust trapped contains metal sulfates, etc. Scaringelli et el. heated it in nitrogen gas, and evaporated only sulfuric acid mist separating it from other dusts. Evaporated sulfur trioxide was reduced by copper and measured as sulfur dioxide. However, no detailed report has been made as to the conditions of manipulation, so that in this study, separation and reduction temperatures of sulfuric acid mist were checked. The device consists of a quarz tube, with 3 cm inner diameter, 1 m long, and 35 cm long separation furnace and 30 cm reduction furnace which can be heated independently of each other. The sample enters the separation furnace, and sulfuric acid is evaporated. Sulfur trioxide is generated and sent to the reduction furnace by nitrogen gas. Twenty mesh copper net, which was hydroge reduced overnight at 900 C was used. A certain quantity of 103N sulfuric acid was taken by micro-syringe and was made the standard sample. Scaringelli et al. used the separation furnace at 400 C, but in this study, quantitative analysis could be made at 200 C. Although Scaringelli repored that the separation furnace was at 500 C, in this study, at 700 C, no reduction occurred, and at 800 C nearly complete reduction occurred.

29762

Konosu, Hisao

TRIAL CONSTRUCTION OF NON-DISPERSION TYPE VISIBLE LIGHT GAS ANALYZE AND DETERMINATION OF NITROGEN DIOXIDE, CHLORINE, AND BROMINE. (Hibunsangata kashigasu bunsekikei no shisaku to nisanka chisso, enso, shuso no teiryo). Text in Japanese. Bunseki Kiki (Analysis Instr.), 9(6):362-366, June 1971. 8 refs.

A trial non-dispersive type visible light gas analyzer for process, quality, or safety control was built, and it was applied to the continuous measurement of a two-component inorganic gas mixture. The measurement principle was that the difference in relative absorption intensities between the sample gas and the reference gas was continuously recorded in the visible spectrum. Unlike conventional devices, the analyzer had no filter equipped with relatively long light path gas cells (50 cm) for high sensitivity. It was composed of a power supply for the light source (tungsten0 lamp), an optical system (single light source, double beam, and single detector), a power supply for the detector (photomultiplier) an amplifier and a recorder; it used the deflection method. The performance test showed that the span drift (plus or minus 2%/12 hr), the influences of ambient temperature (1% C), and the source voltage (plus or minus 2.5%/90-110V) were somewhat high. These were caused by the voltage drift of the power supply for the light source which changes light source intensity. Several densities of two-component gas mixture samples (determined by the condensation-gasification method) were prepared using nitrogen as a balance gas (reference gas: nitrogen). The impurities in nitrogen dioxide (nitrous oxide, nitric oxide, and nitrogen tetroxide) hardly influenced the measured values. It took two or three minutes from the 0, 100 adjustment to the measurement. Beer s law held in low densities (absorbance: O-0.25), and for higher densities a regression quadratic curve was estimated. The limit of detection was 0.005 vol%, and the measuring range was 0-1 vol% for nitrogen dioxide. The influence of the interference gas was hardly considered because few gases absorb visible light. This method may be used to determine the analytical components in a many-component gas mixture.

29801

Kovalenko, N. P.

METHODS OF DETERMINING SULFUR DIOXIDE (REVIEW). Ind. Lab. (USSR) (English translation from Russian of: Zavodsk. Lab.), 36(11): 1680-1684, Nov. 1970. 84 refs.

Iodometric, redox, photometric, and other methods of determining sulfur dioxide in air or waste gases, including smokes, are briefly summarized. The accuracy, range, and speed of analysis of many of the methods are noted. Also described are available instruments for the automatic or continuous determination of SO2.

29953

Kemka, Rudolf

PARALLEL DETERMINATION OF NICKEL AND COBALT IN URINE AND ATMOSPHERE. (Stanovenie niklu a kobaltu vedla seba v moci a v ovzdusi). Text in Czech. Pracovni Lekar. (Prague), 23(3):80-85, 1971. 12 refs. (Presented at 11 Ceskoslovenskom kongrese pracovneho lekarstva s medzinarodnou ucastou v Usti nad Labem, June 4, 1969.)

A spectrophotometric method was used to determine the amount of nickel and cobalt with 4-(2-pyridylazo) resorcin (PAR) in urine and in the atmosphere. This method is based on the formation of chelates and cobalt with PAR, with the absorption maximum at 487 and 500 nm respectively. The nickel chelate is somewhat weaker than the cobalt chelate, and in the presence of fluorides and Na2EDTA, it decomposes within 10 min at 100 C, while the cobalt chelate does not change. Ten unexposed persons were tested; a mean of 0.027 micron g Ni/ml and 0.023 micron g Co/ml was found in urine. The exposed workers (who were employed at a nickel smelting plant) had maximum nickel values in urine of 0.240 micron g/ml and maximum cobalt values of 0.383 micron g/ml. The maximum mean values in the atmosphere were 0.349 micron g Ni/l air in nickel electrolysis and 0.477 micron g Co/l air in cobalt production.

30199

Larsson, Leif

PORTABLE APPARATUS FOR DETERMINING MERCURY IN AIR. (Baebar apparat foer bestaemning av kvicksilver i luft). Text in Swedish. Svensk. Papperstid (Stockholm), 74(8):241-244, April 1971.

A method for the determination of mercury in air with the aid of a light, portable device is described. The method is based on the absorption of mercury in an ampoule containing a carrier impregnated with potassium permanganate solution acidified with sulfuric acid. The absorption of the mercury is quantitative. In a subsequent step the mercury is extracted from the ampoule and can then be determined by a suitable wet chemical method. This method has been used for measurements in a chloralkali mill. (Author summary modified)

30634

Tanaka, Masao

ON MEASURING INSTRUMENTS FOR SULFUROUS ACID GAS IN EXHAUST SMOKE. (Haien chu no aryusangasu sokutei kiki ni tsuite). Text in Japanese. Nenryo oyobi nensyo (Fuel and Combustion), no. (2):25-31, Feb. 1971.

The basic mechanism of a non-dispersion infrared-type (NDIR) gas analyzer and the gas sampling system for the analyzer are introduced. Any gas composed of different elements such as carbon monoxide, sulfur dioxide, ammonia, water, methane, ethane, ethylene, acetylene, or benzene, shows its own specific pattern of infrared ray absorption in the range of 2-15 micron. When a particular gas flows into the beams of infrared rays, the intensity of infrared rays of specific wavelength, having passed through the gas, changes according to the density of the gas. The intensity of a specific infrared ray is then detected by an infrared ray detector for the measurement of the gas density. A positive-type NDIR analyzer was used as an example to further describe the basic construction and mechanism of the NDIR analyzer. The infrared ray beams from the light sources are interrupted intermittently at an interval of 2-15 Hz by a rotary shutter, and go through the measuring tank and comparison tank to reach the detector. Nitrogen, or a similar gas, that does not absorb the infrared ray is sealed in the comparison tank, while the gas constitutent to be measured is sealed in the detector equipped with a membrane condenser inside. The membrane partitions the interior of the detector into two and intermits the lights from the measuring tank and comparison tank simultaneously. The energy difference between the two lights is thus detected. since the light coming through the measuring tank has become weak according to density of the gas. When sampling gas for the analyzer, the gas should be pretreated before being fed into the analyzer. The sampling process usually consists of sampling, removal of dust, separation of condensate, removal of interference substances, and pumping. Although some of the SO2 is dissolved in the condensate water during the gas sampling, the amount lost is theoretically negligible.

30785

Yatsumaki, Maoomi

ANALYSIS OF NITROGEN OXIDES IN AUTO EXHAUST GAS. (Jidosha haiki gasuchu no chisso sankabutsu bunsekiho to sono mondaiten). Text in Japanese. Preprint, Japan Society of Analytical Chemistry, Tokyo, 5p., 1971. (Presented at the Nitrogen oxides Conference, 3rd, Tokyo, Japan, Jan. 22, 1971.)

The nitrogen oxides concentration in automobile-exhaust gas changes with engine driving conditons. The concentration ranges from 10 to a few thousand ppm, and more than 95% of it is nitric oxide; nitrogen dioxide is very rare. Infrared absorption analysis, ultraviolet absorption, mass spectrometric analysis, and wet chemical analysis are used to determine nitrogen oxides in automobile exhaust. The first three are used for continuous NO analysis. Its use with a nondispersion-type ultraviolet analyzer allows the continuous analysis of a system containing both NO and NO2. The nondispersion-type ultraviolet analyzer can be applied to the system to convert NO into NO2 both for continuous and sampling analysis. Mass spectrochemical analysis is also utilized for continuous nitric oxide analysis. Phenol-disulfonic acid and Saltzman methods are employed in continuous wet chemical analyses. Also, an interference filter eliminates the effects of interfering components of coexistent substances in nondispersion infrared analyses excluding that of water: the water must be eliminated carefully with a desiccating agent. Drierite is widely used as the drying agent; however, the reaction converting NO2 into NO proceeds on the bed of the dryer. The regulation of exhaust has been changed from the concentration standard to the mass standard, so the sampling method does not require the swift response needed in the continuous process. However, constant volume sampling requires accurate analysis since it is applied to a diluted sample. The conversion of NO to NO2 in the sampling bag interrupts the NO2 analysis. The development of Chemiluminescence method is expected.

31004

Benarie, Michael M.

THE FALLING VELOCITY OF SUSPENDED PARTICLES IN LOW DENSITY AIR. Staub (Duesseldorf), 22(3):118-123, March 1962. 10 refs. Translated from the German. Sanzare Assoc., Inc., Philadelphia, Pa., 21p.

Measurement of the falling velocity of dust particles in gases is an important method of determining the size of the particles. Since Stokes law corrected by Cunningham and Millikan is utilized for this purpose, the validity of the law has been checked out experimentally for the case of single particles, determining mass, density, and falling time independently of each other and any law of resistance. A method of radioactive counting has been employed.

31005

Clarenburg, L. A. and L. H. Princen

AN IMPROVED APPARATUS FOR THE MEASUREMENT OF GRAVIMETRIC AEROSOL CONCENTRATION. Staub (Duesseldorf), 23(4):234-236, April 1963. 1 ref. Translated from German. 11p.

An optical method of measuring concentrations of aerosols is described, in which the amount of background light is reduced considerably compared to a previous apparatus. Modifications which have been made to the lenses and dark field shutters are indicated. A battery has been replaced by alternating current to achieve as high a sensitivity as possible. Aerosol concentrations to concentrations of three times 10 to the minus 12th power g/liter can be measured accurately.

31047

Kast, W.

DISRUPTION OF SEDIMENTATION ANALYSIS BY PARTICLE FLOW IN THE SEDIMENTATION CHAMBER. (Die Stroerung der Sedimentationsanalyse durch das Umstroemen von Koerpern im Sedimentationsgefaess). Staub (Duesseldorf), 20(7):205-211, July 1, 1960. 10 refs. Translated from German. Translation Consultants, Inc., Arlington, Va., 28p.

Aside from microphotographic determination, the particle size distribution of dust for sizes less than 50 micron can be calculated from the falling velocity of individual particle fractions. The particle mixture which is to be examined is suspended in a suitable fluid and the progress of sedimentation with respect to time is observed. Methods to minimize disruptions of sedimentation and the resulting errors are discussed.

31049

Olaf, J.

ULTRAMICROSCOPIC ANALYSIS OF PARTICLE SIZE. (Korngroessenanalyse unter Verwendung des Spaltultramikroskops). Staub (Duesseldorf), 20(6):180-183, June 1, 1960. 16 refs. Translated from German. Translation Consultants, Inc., Arlington, Va. 15p.

When analyzing the particle size of mine dust, one is faced with the task of determining a broad rang of particle sizes and a mixture of materials, which differ greatly with respect to their weights and optical properties. Problems connected with photographic methods of analyzing particle size are discussed. The minimum exposure time for small particles may cause overexposure in the case of large particles. An apparatus is described which consists of an ultramicroscope below which there is a sedimentation chamber, a light source, and a photographic assembly.

31251

Herrmann, Guenter

ISOKINETIC AIR SAMPLING WITH CRITICAL ORIFICES. Chem. Tech. (Berlin), 18(1):7-13, 1966. 12 refs. Translated from German. Mundus Systems, McGregor and Werner, Washington, D. C., 26p.

In obtaining air samples, constant and pre-calculated flow velocities can be attained with orifices of appropriate dimensions under certain conditions, in which cases the volume meters or flowmeters can be dispensed with. After a thorough mathematical description of the principles of the dynamics of gases, the test results were applied to commercially available injection needles, self-produced orifice plates made up of metal foil, as well as glass orifices. Injection needles can also be used without calibration, if a measurement error of five percent is considered. From determinations of the cross-section, the flow velocities in metal foil orifice plates can be predicted with a great deal of certainty, while glass orifices are distinguished by the fact that, next to their chemical and mechanical resistance capabilities, they come closest in flow behavior to theory. Flow velocities from 0.15 to 1400/hr were realized with the types of orifices studied. The scope of the various possibilities for use permits a resolution of practically every type of air sampling problem.

31367

Arito, H., R. Soda, and S. Koshi

APPLICATION OF LIGHT SCATTERING FOR DETERMINATION OF ATMOSPHERIC SO2. (Kosanran o riyo shita taiki-chu SO2 nodo no renzoku sokuteiho). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 5(1):45, 1970.

(Proceedings of the Japan Society of Air Pollution, Annual Meeting, 11th, Tokyo, Japan, 1970.)

A sulfur dioxide gas concentration measuring device was constructed using the SO2 characteristic of forming sulfuric acid particles in reaction to vapor. The device constituted a larger tube with an inner tube lined with platinum wires and wound by a coil heater. The SO2 gas/air mixture was emitted from one end of the larger tube and sent through the inner tube, heated to 400 C. The SO2 changed into SO3 and came into contact with a near-saturated vaporized air at the end of the inner tube and formed sulfuric acid particles The particles crossed a belt of light and were amplified by a photoelectric particle amplifier placed at a 90 deg angle; the strength of the scattered light was measured. The results depended on the quantity of gas flow, air flow, the condition of platinum contact, and the size of the device. Under the same conditions, the accuracy of results was assured. The SO2 gas concentration and the strength of light scattering formed a linear relationship.

31614

Effenberger, Ernst

A SIMPLE INSTRUMENT FOR MEASURING DUST AND ITS CALIBRATION. Staub (Duesseldorf), vol. 52:715-728, 1957. 5 refs. Translated from German. Sanzare Assoc., Inc., Philadelphia, Pa., 20p.

A fully automatic dust measuring instrument is described which operates by impaction and has photoelectric recording. The air to be tested flows through the inlet pipe, into a rubber tube, through the nozzle at increase speed, and strikes a recording drum which has been covered with prepared paper. The minute particles which are contained in the air become strongly accelerated and penetrate the prepared surface where they remain adhered. Due to the rotation of the drum and a lateral motion of the nozzle, a strip of dust appears on the paper and encircles the drum in a spiral shape. The intensity of this strip of dust is a measure of the amount of solid impurities in the air. Procedures for using this technique both in- and out-of-doors are described. Calibration of the measuring instrument is also discussed.

31615

Olaf, J.

METHODS FOR MEASURING DUST. (StaubmeBverfahren). Staub (Duesseldorf), 19(6):221-252, June 1, 1959. 166 refs. Translated from German. Sanzare Assoc., Inc., Philadelphia, Pa., 17p.

Dust measuring processes are reviewed, with special reference to the coal mining industry. Filters, centrifugal separation, impact sampling, thermal separation, and electrical separation are discussed. Optical (Tyndalloscop) mechanical, electrical, and acoustical measurement procedures are described. The characterization of the specific surface of dust may be accomplished by determining the flow-through time of a certain quantity of air through a layer of particles of defined thickness. Methods also exist for the determination of the form factor, the deviation from the spherical form. Light and electron microscopy measurements are indicated, as well as techniques for sedimentation analysis.

31626

Nagami, Yasuki

DETERMINATION OF PARTICLE CONCENTRATION IN EXHAUST GASES OF CHIMNEYS. Bunseki Kagaku (Japan Analyst) (Tokyo), 12(11): 1110-1117, 1963. 5 refs. Translated from Japanese. Mundus Systems, McGregor, and Werner, Inc., Washington, D. C., 28p.

Methods of measuring particle concentrations in stack gases are discussed. The selection of sampling locations is mentioned. Flow velocity measurements by pitot tube are considered, depending upon the shape of the cross-section of the chimney. Exhaust gas temperature is determined with a chromel-alumel thermocouple, and static pressure is measured by a slanting pipe manometer. Methods of determining the moisture content of combustion exhaust gas are also cited. Sampling methods for the determination of particle concentrations are finally discussed, including the use of filter paper, dust tubes, impingers, cyclones, and suction apparatus. The Ringelmann method and photoelectric particle densitometers are mentioned.

31924

Baba, Yoshio

MEASUREMENT/ANALYSIS OF ODOR AND TECHNIQUES OF OFFENSIVE ODOR PREVENTION. (Shuki no sokutei bunseki oyobe akushu boshi gijutsu). Text in Japanese. Preprint, Smaller Enterprises Promotion Corp. (Japan), 60p., 1971. (Presented at the Public Nuisance Prevent. Tech. Seminar, Japan, 1971.)

Odors can be measured by a human panel procedure or with analytical apparatus; the former method is used primarily to determine the intensity of an odor and/or kinds of odors, while the latter method is more often used for the analysis of substances giving a particular smell. Odorants which exist in extremely small quantities can now be detected by gas chromatographic analysis. However, it is still difficult to correlate the detected odorants and the unpleasant odor they are believed to cause. Various olfactory tests are cited. Deodorizing techniques include combustion, scrubbing, adsorption, oxidation, masking, neutralization, and a chemical deodorization method. The preventive measures implemented at the source of odor generation are cited for oil refineries, Kraft pulping, petrochemical processes, chemical processes, painting and printing industries, slaughterhouses, pig and poultry farming, and diesel or jet engine exhaust. The analysis methods are given for acrolein, formaldehydes, acetaldehyde, mercaptans, benzenes, hydrogen chloride, ammonia, and hydrogen sulfide.

32100

Kamiyama, Horoaki, Toshi Tomizawa, and Teruo Yatabe

COMPREHENSIVE EVALUATION OF ATMOSPHERIC SULFUR OXIDE MEASUREMENT METHODS. (Taiki chu no iwo sankabutsu sokuteiho ni kansuru sogoteki hyoka). Text in Japanese. Karyoku Hatsuden (Thermoelectric Power Generation), 22(3):265-275, March 1971. 11 refs.

The AP Meter (an automatic conductivity analyzer/recorder) is specified as the permanent monitoring device for atmospheric sulfur oxides (sulfur dioxide and sulfur trioxide) under the Environmental Standards. It does not always yield values agreeing with those obtained by other methods. To clarify this point, analyses were made of pollutants in the atmosphere, pollutants in the absorbent solution of the AP Meter, and problems involving proper use of the measuring instrument. The mass spectrometric method, having no relationship with the AP Meter and Rosaniline methods, was used to detect pollutant gases in the atmosphere, to examine the reliability of the other two methods, and to detect pollutants other than SO2. The low temperature concentration method using liquefied oxygen was used for the quantitative analysis of atmospheric SO2, whose density is usually very low. A chemical analysis of the AP Meter s absorbent solution clarified its component substances to determine if the atmospheric pollutants could be transformed into electroconductive substances when absorbed by the solution. An experimental device prepared a large quantity of accurate standard gas and determined the bias and variation errors of the AP Meter and Rosaniline methods. Following laboratory experiments, field tests were conducted. Generally, the values indicated by the AP Meter were higher than those indicated by the Rosaniline method. This was not due to other pollutant gases, but to evaporation loss of the absorbent solution. This trend was greater when temperature, humidity, and SO2 density were lower. Thus, the AP Meter tends to indicate values higher than the actual value in winter, when temperature and humidity are low. With corrections for these factors, the AP Meter values differ by 10% or less from those obtained by the Rosaniline method. No gaseous pollutant notably affected the AP Meter s values. Nitrogen oxides of a few hundred ppb or less hardly affected the AP Meter. When ammonia was present in the atmosphere, AP Meter values were on the negative side. Salt caused an 0.01 ppm difference in the meter.

32441

TRANSPORTABLE INFRARED GAS ANALYZER ULTRAMAT A. (Tranportables Infrarot-Gasanalysegeraet Ultramat A). Text in German. Motortech. Z. (Stuttgart), 32(8):298, Aug. 1971.

The gas analyzer Ultramat A, which operates on the two beam alternating method, can be used for measuring carbon monoxide, carbon dioxide, methane, sulfur dioxide, and other heteroantomic gases which have absorption bands in the near infrared range. The analyzer and process are examined in detail. The ambient temperature for the measurements ranges between 0 and 45 C. Sampling speed is 2 l/min.

32453

Becker, Herbert

TUNABLE LASER ANALYZES GAS. (Abstimmbarer Laser analysiert Gas). Text in German. VDI (Ver. Deut. Ingr.) Nachr. (Berlin), 25(31):7, Aug. 1971.

The spin-flip Raman laser, which can be used to measure concentrations of air pollutants, is examined. The process is defined and the various steps and components of the laser are delineated. The concentrations of the various components of a waste gas sample are measured by the infrared absorption method. The high sensitivity of the method enables the determination of concentrations of 0.1-10 ppm nitrogen oxides. Measurement times at a sample volume of 1 cc is 4 sec.

32946

THE DETECTION OF AIR POLLUTANTS WITH TUNABLE LASERS. (Der Nachweis von Luftfremdstoffen mit abstimmbaren Lasern). Text in German. VDI (Ver. Deut. Ingr.) Z. (Duesseldorf), 113(13):988-989, Sept. 1971. 4 refs.

Several lasers are now available which can be tuned to any wavelength in the infrared region. Diode lasers are made of a lead-tin-tellerium semiconductor and, depending upon the amount of tin and lead present, the wavelength emitted can be adjusted between 6.5 and 32 micron. With the exception of nitric oxide and carbon monoxide whose absorption bands do not fall within the appropriate wavelengths, such diode lasers can be used for the determination of air pollutants. The electrons in a spin-flip Raman laser, which is tunable between 2.5 and 16 micron, act as scattering centers. The nitric oxide content of an air sample in the range of 0.1 to 10 ppm was determined with a spin-flip Raman laser. Measuring time was four seconds.

33307

Diem, Max and Guenther Jurksch

COMPARATIVE MEASUREMENTS OF THE DUST CONTENT OF THE AIR IN ACCORDANCE WITH PRECIPITATION AND CONCENTRATION METHODS. Staub (Duesseldorf), 21(8):345-355, Aug. 1, 1961. 17 refs. Translated from German. Mundus Systems, McGregor and Werner, Washington, D. C., 44p.

Methods for the measurement of dust in the air were compared. The Hibernia and Wabolu funnels were changed regularly every 14 days. The adhesive foils were changed every seven days. The Landesanstalt vessels were changed in the first three measuring periods every 14 days, and every seven days in the fourth measuring period. The two concentration measuring apparatus were used at the beginning of the eleventh measurement period. The filter of one was changed every 14 days and the filter of the other every seven days. Rainwater apparatus collected the insoluble and soluble dust particles in the atmosphere. The quantity depends on the material of the funnel or collecting vessel. The adhesive foil picked up the insoluble components of the dust. The foil displays greater susceptibility to extreme weather phenomena such as heavy rain, sleet, and hail. They are advantageously used where they are set up in a confined area with a large number of measuring points. Dust concentration counting devices on a filter basis are dependent on the position of the collection filter. The horizontal open position must be protected against rain. It also stores sediments from the wind in addition to the dust samples.

33373

Naito, Keikichi

LIDAR FOR AIR POLLUTION MEASUREMENT. (Taiki osen kansoku-yo raida). Text in Japanese. Kisho Kenkyusho Nyusu (Meteorol. Res. Inst. News), no. 4:4-5, April 1971.

Lidar can be utilized to detect inversion layers, mingled layers, and the interface of sea and land breezes, volume distributions of suspended particulates, and dispersion patterns of high stack smokes. At present, ruby crystals are used as elements causing oscillation. Ruby crystals are stable and durable but have the disadvantage of yielding slow pulse repeats (once in 5 sec). Faster pulse repeats and an energy output of a certain degree are desirable. One of more recently developed laser oscillation elements is YAG, a crystal of yttrium, aluminum and garnet, which creates a 1.06 micron wave length and a pulse repeat of approximately 1000 Hz. The wave length 1.06 micron presents a problem in photoelectric conversion, which can be solved if the wave length can be changed to 0.53 micron by using certain crystals with nonlinear transmission of light. This laser refraction is called SHG (Second Harmonics Generation), and some of practical crystals with excellent SHG are KDP and BNN. For the time being, the combination of SHG and YAG seems to be the best solution for air pollution lidar.

36260

Fort Detrick, Frederick, Md.

MICROBIOLOGICAL ANALYZING METHODS FOR AEROSOLS. 1955 (?). Translated from Russian (?), 62p., March 1957. NTIS, DDC: AD 682557

Bacteriological and mycological methods of analyzing aerosol and aerogels are presented. During bacteriological analysis of an aerosol, determination of the general quantity of bacteria in a unit of a volume of aerosol (general dispersion) seldom limits the testing. Besides the general dispersion, the quantitative characteristic of microflora is determined. Sedimentation methods (spontaneous sedimentation, the Shafir and Krotova methods) and filtration techniques (Mironov, Milyavski, Dyakonova, and Shtrauss methods) are reviewed. Analysis of the characteristics of the microflora of the air can take three directions: determination of the sanitary-indicative microorganisms, of the presence of pathogenic microorganisms, (by mycological analysis of the aerosols) and of the presence of fungus microorganisms. The microbiological study of aerosols is also discussed, and methods of studying the entrance of aerosols into the human organism during breathing and of conducting a biological experiment in the field of aerosols are also reported. The application of dust chamber methods, dust mask method, and the intratracheal introductions of suspensions of dust particles are included. A method of obtaining artificial smoke is also reported.

36826

Kolmeschate G. J. van and Vos R. H. de

MERCURY IN THE ENVIRONMENT - TECHNIQUES OF ANALYSIS. (Analysetechnieken voor kwik in het milieu). Text in Dutch. TNO Nieuws, 26(7):415-418, July 1971.

Methods of analysis of mercury are divided into two categories: those which determine the total mercury content and those which specify the organic mercury compounds. A classical method of determining total mercury content is the spectrophotometric dithizon method. This is described with examples. The other methods are atomic absorption and neutron activation analysis. For the organic mercury compounds, gas chromatography is used. Research institutes are mentioned. As a detection system, the electron capture detector is very suitable for routine analysis. Neutron activation analysis is speedy, accurate, and very adaptable to remote control on large scale applications.

36838

Tsuji, Kusuo

STUDIES OF SUSPENDED PARTICULATES IN AIR (4). (Taikichu no fuyu funjin ni kansuru kenkyu (daiyonpo)). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):81, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

A method to determine selenium in the air, which might have increased due to mass production of semi-conductors as well as dyes and alloys, was tested. Generally, selenium is determined by means of colorimetry. In this study, after treating the sample with aqua regia or a mixture of hydrochloric acid and potassium chlorate, chlorine is eliminated. Then, selenic acid is converted to selenious acid by heating with hydrochloric acid and polarography is used to determine the selenium.

36859

Sato, Shizuo

STUDY OF THE INFLUENCE OF SO_2 ON NO_2 MEASUREMENTS. (NO_2 sokutei-chi ni oyobosu SO_2 no eikyo ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):66, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

The effect of sulfur dioxide on the determination of nitrogen dioxide was examined. First, sulfur dioxide solutions of several different concentrations were added to the nitrogen dioxide solution, the rate of light absorption of which is 0.315; the light absorption rates were measured. The more concentrated the sulfur dioxide and the more time elapsed after the mixing, the less was the rate of absorption. When nitrogen dioxide gas and sulfur dioxide gas are mixed at the ratio of from 1 to 1 to 1 to 10 (1 to 2 in average, for the air in a measurement) by means of permeation tubes, no effect is seen for ratios of 1 to 1 and 1 to 1.5 after 24 hr and for a ratio of 1 to 10 after 4 hr.

37107

Malakhina, A. Ya., M. I. Til kov, and Yu. K. Shaposhnikov

PAPER CHROMATOGRAPHY OF POLYNUCLEAR AROMATIC HYDROCARBONS. (Bumazhnaya khromatografiya poliyadernykh aromaticheskikh uglevodorodov). Hyg. Sanit. (English translation from Russian of: Gigiena i Sanit.), 36(1-3):97-100, Jan.-March, 1971. 7 refs. NTIS: TT 71-50122

Acetone, benzene, or octane extracts of polynuclear aromatic hydrocarbons (PAH) in dusts at three aluminum works were separated by paper chromatography and analyzed by thin-layer chromatography or fluorometric spectroscopy. The following PAH were determined in dusts deposited in ventilation pipes during the manufacture of electrolytic aluminum: 20-methylcholanthrene, 3,4-benzypyrene, 1,2-benzpyrene, 1,2-benzanthracene, 1,3,3,4-dibenzanthracene, 9,10-dimethyl-1,2-bezanthracene, and anthracene. The compounds were quantitatively determined by cutting out chromatogram spots and eluting them into a solution followed by fluorometric analysis. The 3,4-benzpyrene concentrations in 1-gram dust samples from the three plants were 0.051, 0.039, and 0.042 mg, respectively. The method is also applicable to investigations of PAH in gaseous discharges and effluents.

37253

Bavika, L. I. and L. S. Shinkarenko

DETERMINATION OF SULFURIC ACID IN AIR BY A VANADATE METHOD. (Opredeleniye sernoy kisloty v vozdukhe vanadatnym metodom). Text in Russian. Neftepererab. Neftekhim., 9:40-41, 1971. 5 refs.

Sulfuric acid in air was determined by passing air (0.5-1 l/min) through distilled water to which an 0.5% ammonium vanadate solution was added. The vanadate solution reacted with H_2SO_4 to form a yellow color whose intensity was a linear function of H_2SO_4 concentration and was stable for longer than 10 days. The sensitivity was 0.005 mg H_2SO_4 in 5.5 ml solution and the average error was 9.3%.

37443

Fuzie, Kimika

THE LUNDGREN IMPACTOR FOR DETERMINATION OF AEROSOL PARTICLES. (Lundgren inpakuta ni yoru earozoru no sokutei). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):100, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

The determination of aerosols by a Lundgren impactor has been used to obtain data on particle concentration as a function of particle size and components. This impactor, which has been developed for the U. S. Public Health Service, is cylindrical with 4 steps of collecting drums. Teflon film of 0.3 mm thick coated with silicon grease DC 200 is used for collection. According to Lundgren, particle sizes of 50% cut point at 4 cfm flow velocity and 2 g/cu cm particle density, are 10, 3, 1 and 0.3 micron for 4 steps. The flow velocity can be changed from 0.5 to 7 cfm; 24 hrs sampling at 5 cfm for 150 micrograms/cu m of air collects approximately 30 mg of particles.

37446

Izawa, Y., T. Shioyama, Y. Hirakawa, H. Higuchi, and T. Tanaka

DETECTION OF AIR POLLUTION BY LASER RADAR. (Reza reda ni yoru taiki osen gasu no kenshutsu). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):104, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

A method to determine the distribution of sulfur dioxide, nitric oxide, and carbon monoxide in the air by means of laser radar utilizing resonance dispersion was developed in order to replace the existing chemical method which requires a long time for determination and does not allow remote measurement. This laser radar utilizes pigment laser which allows oscillation over whole wavelengths from violet to infrared by using different kinds of pigments and selection of appropriate wavelength through the use of prism and diffraction grating. For sulfur dioxide, ethanol solution of rhodamine 6 G is used to obtain laser beam with 100 kw of peak output and 100 n sec of plus width. The signal receiver uses a multiplier correcting signal strength, analysis of pulse amplitude by comparison of electric potential, and time measurement by clock pulse to determine the concentration and the location of the gas instantly.

37477

Schaad, Rainer E.

CHROMATOGRAPHY OF CARCINOGENIC POLYCYCLIC AROMATIC HYDROCARBONS. (Chromatographie (Karzinogener) Polyzyklischer Aromatischer Kohlenwasserstoffe). Text in German. Chromatogr. Rev., 13(1):61- 82, 1970. 114 refs.

Methods of extracting carcinogenic polycyclic aromatic hydrocarbons from soot and airborne dust samples are briefly described, and procedures for separation of the components in the extract by column, paper, thin layer, and gas-liquid chromatography are reviewed.

37519

Kuper, Gerhard

LASER-LIDAR, WHAT CAN IT REALLY ACCOMPLISH? (Laser-Lidar, was kann es wirklich)? Text in German. Umwelt (Duesseldorf), 2(1):40-43, Feb./March 1972. 5 refs.

The most important task of the light detection and ranging system (lidar) apart from meteorological measurements is the analysis of air pollutants. It is used for spotting polluters. In order to determine whether the returning signal has been produced by soot, aerosols, or inversion layers and in order to determine how much of a smoke plume is harmless water vapor and how much is pollutant, two laser beams are emitted shortly after each other. The frequency of one laser beam is shifted by temperature regulation of the ruby to the absorption band of hydrogen. Water vapor absorbs this laser beam more than the other. The difference of the two signals is a measure of the water vapor fraction. For qualitative and quantitative analysis of the gaseous components, the Raman effect is used. Since the quantum yield of the Raman laser is so low, the measurement of concentrations which represent the tolerance limit for man is not feasible. The simplest version of the laser-lidar comprises a laser as transmitter and a receiver with a photodiode or multiplier and a recording unit. For simple distance measurements up to about 10 km a pulse power of 5 to 10 MW suffices. Maximum pulse powers of 100 MW at a beam diameter of 10 mm are now achievable.

37608

Okubo, Y., K. Oikawa, and J. Kimura

ANALYSIS OF INORGANIC PARTICULATE MATTER NO. 3. MEASUREMENT OF ATMOSPHERIC PARTICULATE MATTER AND ITS METAL CONTENTS. (Taikichu muki seibun ni kansuru kenkyu. Daisanpo. Fiyu funjin sokuteiho betsukinzoku seibun nodo ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1).93, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

A short time collection method by a high volume air sampler was compared with a long term collection method by low volume sampler in order to find a better method to determine metal content in air- borne dust and to establish pollution patterns in an area. Samples were collected for 30 days; 24 hour collection by low volume sampler and 10 day collection by high volume sampler were performed. Filter papers on which samples were taken, were ashed in low temperature and underwent several acid treatments to produce sample solution, which were analyzed by means of atomic absorption spectrophotometry for cadmium, lead, manganese, and copper. Using the average values of 10 days for samples obtained by the high volume samplers, the amount of dust collected was higher in the samples by the high volume sampler. However, the concentration percentage of metals to the amount of dust was higher with the low volume sampler.

37689

Taguchi Keisuke and Nobuko Akashi

SIZE DISTRIBUTION OF ATMOSPHERIC PARTICLES BY ANDERSEN AIR SAMPLER. (Andasen sanpura ni yoru taikichu fuyu funjin no syudo bunpu). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):83, 1971. 2 refs. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

Size distribution of dust and heavy metals in the air was determined by means of an Andersen sampler. The sample was collected at a velocity of 1 cfm for 3 to 7 days from March to July, 1971, into separators with 8 steps. Size distribution of dust was determined by weighing. Metals, expecially lead, cadmium, and copper were determined by atomic absorption spectroscopy after treating the sample with acid. Size distribution of both dust and heavy metals showed a logarithmic normal distribution. Respirable dust (less than 3.3 micron) ranged from 50 to 70%, and the heavy metals occupied approximately 70 to 80% of the respirable dust.

37690

Oikawa, K., H. Maruyama, T. Iwai, and A. Murase

STATE ANALYSIS OF SUSPENDED PARTICULATE MATTER. NO. 1: ANALYSIS BY X-RAY SPECTROMETRY. (Taikichu fuyu ryushi busshitsu no jotai bunseki ni kansuru kenkyu. Daiippo: X-sen kaisetsu no oyo ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):85, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

Crystalline phase of metals in air-borne dust were determined by means of X-ray diffraction in order to consider the effect of metals on the environment and the origin of the dust. Samples were collected at 3 points in Kawasaki City for 3 to 4 consecutive days, mainly in Feb. 1971 by means of high-volume air samplers with glass fiber filters. Qualitative analysis of elements was carried out by a fluorescent X-ray spectrometer, and the chrystalline phase was determined by an X-ray diffractometer. Silicon dioxide alpha-quartz, sodium aluminasilicate, and hydrated calcium sulfate were abundant. In addition, alphacferric oxide, ammonium chloride, ferrosoferric oxide, and calcium carbonate were found.

37693

Yamashita, Eiji and Shunsaku Jikihara

RESEARCH ON MEASUREMENT OF THE PARTICULATES, REPORT II. (Taikichu fuyu funjin sokutei ni kansuru kenkyu II). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):89, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

The FKS type low-volume air sampler as a collection device for air-borne particulates was examined. The amount collected by this sampler was compared with that collected by a filterholder type-C to find a relationship between them. When several of these samplers were used at the same time, variation in the total air flow rate was 1.7 to 2.6% and measured value of dust varied from 2.6 to 5.4%. Using this sampler, total dust and metals, such as iron, copper, manganese, and lead in the dust were determined at several points in Amagasaki-city.

37728

Japan Public Health Assoc.

THE RESULTS OF COMPARABLE ESTIMATIONS OF THE CONCENTRATION OF FLOATING PARTICULATE SUBSTANCES IN THE AIR BY MEANS OF LIGHT SCATTERING, TAPE AIR SAMPLER, AND FILTER WEIGHT METHODS. (Hikari sanran ryushi nodo ho, tepu ea sampura ho, roshi juryo nodo ho ni yoru taikichu fuyu ryushijo busshitsu nodo no hikaku sokutei kekka). Text in Japanese. 11p., 1970 (?).

Values estimated by means of the filter weight method (selected as the standard estimation method for particulate substances in the air), light scattering, and tape air sampler methods were compared. The estimation was made continuously in Tokyo, Osaka, Ichihara, and Kobe. From the data obtained, the correlation between the particulate weight concentration and the number of counts in light scattering methods, and between particulate weight concentration, transmittance, and reflectance of the filter tape air sampler was calculated. Transmittance was expressed by Log I/Io, where Io stands for incident light and I for transmittant light. Reflectance was calculated from the (Xo - X)/(Xo - D) formula, where Xo stands for the reflectance of the filter that does not collect particulates and D stands for the reflectance of standard black filter. From the above comparison, it was clear that the best was the correlation between the number of counts by the light scattering method and particulate weight concentration, followed by correlation between transmittance through a filter of a tape air sampler and the particulate weight concentration, and the worst was the correlation between the reflectance of the filter of a tape air sampler and the particulate weight concentration.

D. AIR QUALITY MEASUREMENTS

02066

W. Breuer, and K. Winkler.

SOURCES AND DISTRIBUTION OF AIR POLLUTIONS ASCERTAINED BY STATIONARY RECORDING OF GASEOUS COMPONENTS. Herkunft Und Ausbreitung Von Luftverunreinigungen, Ermittelt Durch Stationare Registrierung Mehrerer Immissionskomponenten. Proc. (Part I) Intern. Clean Air Cong., London, 1966. (Paper VII/10). pp. 239-42.

Simultaneous, continuous and stationary measurement of the concentration of gas components (CO, CO2, SO2, H2S, C12, nitrous gases, hydrocarbons) combined with the recording of meteorological factors (wind direction, speed of wind, atmospheric stability etc.) enable the identifying of the source of air pollutions (motor vehicle exhaust, domestic heating, power stations, chemical works). The examination of special air conditions and statistical evaluation gives information on the process of distribution. (Author abstract)

04115

M. Z. Gofman

SANITIZATION OF WORKING CONDITIONS IN CHEMICAL AND PHARMACEUTICAL PLANTS WHICH USE MERCURY AS A CATALYZER. Gigiena i Sanit. 28, (12) 73-6, Dec. 1963. Russ. (Tr.) (Translated by B. S. Levine in U.S.S.R. Literature on Air Pollution and Related Occupational Diseases, Vol. 12.) CFSTI: TT 66 61429

Mercury vapor was found in the air of production rooms of the chemopharmaceutical industry producing synthetic drugs, and of the chemical industry producing technical organic synthetic substances. The presence of mercury vapor was not limited to the air of work rooms in which metallic mercury or its compounds have been used as catalyzers, but also in the air of rooms assigned to the processing successive production phases, as a carry-over by the reaction mass, or by the intermediary half-products. In making sanitary evaluations of such plants this fact should be taken into consideration; it should also play an important part in making sanitary insepctions of industrial production plants in which mercury and its compounds are used as catalyzers. Mercury desorption from walls, ceiling, surfaces of equipment, etc. should be regarded as a significant factor in air contamination with mercury vapor in processing rooms of such production industries. Coating all surfaces, including those of equipment, with a mercury vapor nonpermeable varnish or paint will markedly reduce the amount of adsorbed and permeated mercury vapor, the concentrations of which will be still further reduced by the introduction of demercurization of the working premises. In plan- ning new, or reconstructing and renovating previously existing industrial premises of the type under consideration, the location of technological processes should be arranged so as to reduce to a minimum air pollution with mercury vapor. Manual operations should be automated. All production processes which used mercuric compounds as catalyzers, and all associated production states, must be evaluated from the sanitary hygienic viewpoint as industries which employ mercury and which must comply with corresponding sanitary specifications. (Author conclusions)

05466

S. Horiguchi, T. Utsunomiya, A. Kasahara, S. Shinagawa, K. Iyoda, N. Tanaka, N. Tsuyama, H. Ikutomi, K. Miura

A SURVEY ON THE ACTUAL CONDITIONS OF FACTORIES HANDLING MANGANESE COMPOUNDS. Japan J. Ind. Health, (Tokyo) 8, (6) 19-28, June 1966. Jap.

A survey of the working environment in plants handling manganese compounds was carried out in Osaka from December, 1963 to January, 1964. An analysis of the air in the plants showed manganese concentrations of 2.3 to 17.1 mg/cu m (median 8.4 mg/cu m) in the areas where maganese ore was ground, 3.8 to 8.1 mg/ cu m (median 4.9 mg/cu m) where electrodes were manufactured, 1.9 to 21.1 mg/cu m (median 4.3 mg/cu m) where dry cell batteries were manufactured. An examination of 134 workers revealed 4 showing clear signs of disorders of the central nervous system indicating manganese poisoning. Slight neurological symptoms were found in 11 of 47 workers grinding manganese ore, 4 of 32 workers manufacturing electrodes, and 7 of 55 workers manufacturing dry cell batteries. No significant findings were seen in blood and urine examinations. It was recommended that processes and equipment in the plants be improved, periodic medical and environmental examinations be strictly enforced, early detection of illness and adequate treatment be given, and a health education program be initiated. (Athors' summary, modified)

06755

E. Effenberger

(DUST LEVEL MEASUREMENTS TO DETERMINE THE DEGREE OF AIR POLLUTION.) Staubkonzentrationsmessungen zur Ermittlung des Verunreinigungsgrades der Luft durch Korpuskulare Beimengungen. Beitr. Problem Luftreinhaltung (Essen) (68) 35-56, Nov. 1965. Ger.

Various aspects of the problem of dust in the air, its origin, effects and measurement are reviewed. Among the natural sources, forest fires and volcanic eruptions are mentioned. More important are manmade dusts deriving mostly from all kinds of combustion. The effects of dust on all forms of life are not completely known. Some occupational diseases like silicosis and other harmful effects of dust are described. The retention of particles of various sizes in the lungs is discussed. Results of large-scale health examinations in Prague are quoted. A section is devoted to particle size distributions and a typical example is quoted. Problems and methods of dust concentration measurements are discussed in detail. A large list of measuring equipment is given, both from Europe and the USA. In each case the principle of operation is noted and remarks pertaining to their practical use are added. Another section deals with the problem of how dust concentrations are correlated with dust fall measurements. Functional relationships between the two quantities, obtained experimentally, are plotted in several graphs and discussed in detail. Both concentration measurements and dust fall measurements bear a certain amount of statistical uncertainty. This, however, is not too objectionable since the effects of dust on humans can be classified only in three to five degrees at best. The article is concluded by 82 bibliographic references.

07393

K. Nakayama

PRESENT STATUS OF AIR POLLUTION IN CITIES AND TOWNS. Text in Japanese. Kuki Seijo (Clean Air - J. Japan Air Cleaning Assoc.) (Toky/). 3(3):4-10, 1965. 12 refs.

A review of well-known air pollution episodes is given citing environmental conditions, damages, and causes for episodes in Meuse (Belgium) in 1930, Donora, Pa. in 1948, London in 1952, Mexico in 1950, Yokohama (Japan) in 1946, and Los Angeles at present. The present problems of air pollution in Tokyo are dealt with including dust fall, SO2 concentration, floating soot, dust, and hydrocarbons. The average value of dust fall was 23.46 tons/sq km/30 days for 1959 to 1963; the soluble elements of soot fall were measured at 6.47 tons/sq km/30 days. The maximum was recorded in 1961; seasonal measurements indicate a maximum in February and a minimum in December. Yearly variations of the quantities of coal and petroleum used between 1955 and 1964 indicate a relation between dust fall and the amount of coal used, but no relation between the latter and petroleum consumption. The distribution of SO2 gas concentrations in 1964 as measured by the lead peroxide method is shown on a map of Tokyo. Hydrocarbon concentration of C2 to C8 compounds ranges from 15 ppb to 1.5 ppm. In heavily trafficked areas the concentration of 3,4-benzopyrene is between 1.3 and 6.6 microgram/ 100 cu m. The effects of automobile exhaust from the gasoline engine are detected as high as 500 m. Also, water pollution from the Samida river causes ammonia and hydrogen sulfide to be discharged into the air.

07936

Hernandez-Gutierrez, F.

AIR POLLUTION BY CARBON MONOXIDE. ((La polucion del aire por oxido de carbono.)) Text in Spanish. Anales Med. Cir. (Barcelona), 52(1):58-77, Jan. 1966.

In addition to a comprehensive review on the physiological effects and significance of CO pollution, the entire field of air pollution is reviewed. Data are given on the amounts of various pollutants and their effects on health and the economy. The amounts of pollutants discharged annually into the air in the City of Barcelona are: 600,000 tons of water vapor, 850,000 tons of CO2, 80,000 tons of CO and 35,000 tons of SO2. Snow which fell in 1962 and in 1965 indicated that the air over Barcelona in 24 hours contained between 390 and 580 tons of dust, 6 tons of nitrogen oxides, and 19.5 tons of SO2 and SO3. The average and maximum values of carbon monoxide in various cities are presented and in London range from an average of 1.8 ppm to a maximum during a smog of 200 ppm. In garages the concentration may be as high as 1.250 ppm and concentrations of 200 ppm are not uncommon. The various methods for measuring CO are outlined and control is discussed.

08120

Khukhrina, Ye. V.

EVALUATION OF THE MODERN METHODS OF DETERMINATION OF THE AMOUNT AND DISPERSITY OF DUST. In: A. A. Letavet and Ye. V. Khukhrina (eds.), Methods of Studying Industrial Dust and the Incidence of Pneumoconioses. ((Metody izucheniya proizvodstvennoy pyli i zabolevayemosti pnevmokoniozam.)) Leningrad, Meditsina Publishing House, 1965, 123p. Translated from Russian. Clearinghouse for Federal Scientific and Technical Information, Washington, D. C., Joint Publications Research Service, TT 66-30952, p. 5-9, March 11, 1966.

As an example of the relationship between the number of cases of pneumoconiosis and the level of contamination of the air with dust, a study was conducted on the health of sand blasters in the USSR during the years 1947-1950. Working conditions at different plants varied sharply, depending on the volume of work, the dimensions of the casting the arrangement and state of the sandblasting chambers, and on the measures taken for individual protection. Only the composition of the dust inhaled by the workers, which contained 85- 90 percent quartz particles remained the same. Parallel investigations enable us to affirm that the mass of the active dust establishes the level of the index of the number of cases of morbidity. The significance of the mass of the affecting dust was demonstrated in a specially conducted experimental work. Two series of experiments were set up with white rats into which quartz dust of various dispersity was introduced intratracheally. Consequently it was affirmed that the especially active and dangerous quartz dust, with a particle size of less than 5 microns, did not cause the development of silicosis because the mass of the acting dust was insignificant. The experiements performed indicate the predominant significance of the mass of the acting dust, and especially the mass of the most finely divided dust. Here it is interesting to note that quartz dust consisting of several size fractions caused the development of a silicosis similar to the silicoses caused by the action of dust of higher fractions. Consequently it can be stated that in the multifraction dust the mass of fine particles was insignificant, since this dust fraction did not affect the character of the development of silicosis. Thus it is evident that the origination of silicosis is caused by the mass of the acting dust as well as by its fineness. At the present time, microscopic methods are still being used for the evaluation of the degree of dispersion of dust, but it must be borne in mind that the data obtained express the degree of dispersion with respect to the number of particles of various sizes, and not with respect to their mass.

08818

Spinazzola, A., L. Marraccini, G. Devoto, and S. Zedda

DISTRIBUTION OF SEVERAL VOLATILE TOXIC PRODUCTS WHICH ARE INDICATORS OF AIR POLLUTION IN THE CITY OF CAGLIARI. NOTE III. AMMONIA. ((Studio sul comportamento di alcuni prodotti tossici volatili quale indice di inquinamento atmosferico nella citta di Cagliari. Nota III. -L'ammonica.)) Text in Italian. Folia Med. (Naples), 49(9):641-648, Sept. 1966. 4 refs.

Monitoring stations were set up in 18 locations on streets, street corners, and piazzas of Cagliari. Samples of the air were taken from 8:00 A.M. to 8:00 P.M. and the level of ammonia measured, using Jacobs technique (passage of the air through a solution of 0.02 N sulfuric acid at the rate of 60 1./hr.) followed by the addition of Nessler reagent as modified by Folin, and by a comparison of the resulting color with known standards. The average daily levels are graphed. Levels ranged from 0.053 to 0.304 ppm. These levels are found to be similar to those observed elsewhere in Italian cities. Generally higher levels are noted in areas overlooking the port, a fact attributed to the presence of wastes from ships and sewers.

09403

Dardanoni, L., A. Gullotti, and R. Spano

FURTHER STUDY OF AIR POLLUTION IN PALERMO IN RELATION TO METEOROLOGICAL CONDITIONS. ((Ulteriori studi sull'inquinamento atmosferico a Palermo in rapporto alle condizioni meteorologiche.)) Text in Italian. Riv. Ital. Igiene (Pisa), 27(1-2):29-44, Jan. -April 1967. 11 refs.

Dustfall was determined using the English deposit gauge, SO2 levels determined using the lead peroxide methods, and meteorological conditions noted during 1962-1964. Data are tabulated. Results confirm conclusions made previously, that air pollution is not heavy, with the exception of limited areas with rather heavy Particulate levels. Vertical atmospheric diffusion in the Palermo area is good, while horizontal diffusion is less efficient. The Palermo weather basin, being surrounded by a semicircular mountainous ring, is equally polluted in all areas. Thus, industry should be prohibited within the basin, and the number of central heating units should be increased.

10316

Yasuji Himi

ON THE ATMOSPHERIC DUST AND SMOKE IN INDUSTRIAL CITY. Text in Japanese. Kuki Seijo (Japan. Air Cleaning Assoc.) (Tokyo), 5(6):13-19,1968. 5 refs.

The author obtained and studied data on the particle size distribution, specific gravity, and chemical composition of the atmospheric dust in the Uokohama/Kawasaki industry area. Two types of dust were encountered: one is 'fall' dust consisting of larger particles (expressed in t/sq km/month) and another type is 'suspended' dust consisting of small particles (expressed in mg/cu m. The average quantity per month of fall dust in major Japanese cities is tabulated. The specific gravity of insoluble components, based on the author's collection (by deposit gage) in the Kawasaki/Yokohama area, averages 2.25 to 2.64. The specific gravity in an industrial area tends to be higher. Seasonal changes are insignificant. The measurement of insoluble elements in the fall dust in Kawasaki showed a wide range of particle size distribution with a median of 8.4 micron. Other areas showed median diameters of 4.4-9.0 micron. Fall dust in a non-industrial zone seemed to contain larger particles than dust from an industrial zone. Fall dust from both residential and industrial sources contains larger particles; removal or reduction thus seems possible. The chief chemical components in the fall dust were SiO2, Fe2O3, and SO4. When rainfall is high, SO4 level is also high. Suspended dust particles have an average radius of 0.075 micron, and are mainly soot from incomplete combustion or metallic acid fumes. Microscopic study revealed fine particles (mostly less than 1 micron) of complex shape. This dust contains numerous components, with SO4 prevailing. The degree of SO4 concentration in the suspended dust is in direct proportion to the SO2 concentration in the atmosphere. This point deserves further investigation.

10582

Spagnolini, D.

RESEARCH AND CONSIDERATIONS ON AIR POLLUTION BY CARBON DIOXIDE IN SOME PUBLIC GARAGES IN ROME. (Indagini e considerazioni sull'inquinamento da ossido di carbonio in alcune autorimesse pubbliche di Roma.) Text in Italian. Igiene Sanita Pubblica (Rome), 23 (11-12):539-551, Nov.-Dec. 1967. 18 refs.

Measurements of air samples, taken twice in five public and one private garage during the morning and evening rush hours and during the day, yield of CO levels between 10 and 100 ppm. This level is tolerable for a prolonged period of work, with no danger of chronic intoxication.

11627

Lahmann, Erdwin, Juergen Westphal, Kurt Damaschke, and Margot Luebke

CONTINUOUS OZONE MEASUREMENTS IN A HEAVILY TRAVELLED STREET. (Kontinuierliche Ozon-Messungen in einer verkehrsreichen Strasse). Text in German. Gesundh. Ingr., 89(5):144-147, 1968. 12 refs.

At two measuring stations in Berlin, continuous ozone measurements were taken from the summer of 1966 to the summer of 1967. The first measuring station was located in a busy street in Berlin Steglitz. The air samples were taken at 20 m and sometimes also at 2 m. The second station was in a quiet area without traffic; the samples were taken at 10 m. The results show that in the busy Schlosstrasse, maximum ozone concentration was about 5 pphm. Of the total number of individual measurements, 8.6% exceeded 1 pphm and only 2% exceeded 2 pphm. The maximum daily average was 3.2 pphm. Higher ozone concentrations were measured in summer than in winter. The average ozone concentrations in the traffic-free area were much higher than those in the busy street. Comparison of the diurnal variations of ozone concentration at the two stations clearly shows the influence of traffic. In the traffic-free area, the ozone concentration rises from a maximum between 5 and 6 a.m. to a maximum between 2 and 3 p.m. and gradually subsides again. In the busy Schlosstrasse, the ozone concentration drops to a minimum between 7 and 8 a.m. At this time, which coincides with the morning rush hour, the ozone concentration was just half as high as that in the traffic-free area.

12210

Anechina, P., F. Berrocal, J. M. Romero, J. de la Serna, and B. Sanchez F. Murias

AIR POLLUTION IN MADRID IN 1967. (La contaminacion atmosferica de Madrid el ano 1967). Rev. San. Hig. (Spain), 42(9-10):527- 546, Sept.-Oct. 1968. 9 refs. Translated from Spanish. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 22p.

Air pollution in Madrid was studied in 1967. Samples were taken from three different zones in the city; zones of heavy urban traffic, zones of high industrial concentration, and residential and garden zones. The results showed a marked increase in air pollution over previous years. The amount of sulfur dioxide found was 100% higher than in 1966; the number of days with concentrations of SO2 over 200 microgram/l also increased. On certain days, SO2 concentrations of 0.6 microgram/l were exceeded. Smoke load was assessed during the last months of 1967. Values were higher than 300 micrograms/l. Carbon monoxide average concentrations were 11 ppm, but exceeded 100 ppm at peak hours. The concentration of nitrogen oxides remained unchanged, however, they were higher in winter. The sedimentary dust average per year was 278 mg/sq m/day. This was described as remarkable and was greater than the dust contamination in Paris during 1966. (Author summary modified)

12323

Stratmann, H. and M. Buck

SULFUR DIOXIDE EMISSION MEASUREMENTS IN THE STATE OF NORTH-RHINE- WESTPHALIA. (Schwefeldioxid-Immissionsmessungen im Lande Nordrhein-Westfalen). Schriftenreihe Landesanstalt Immission- und Bodennutzungsschutz Landes Nordrhein-Westfalen (Essen), no. 3, 53p., 1966. 10 refs. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 22p.

First-year operation of a sulfur dioxide concentration monitoring network covering a 5000 sq km area is described and findings are reported. Some 5000 measuring stations were involved and were distributed at 1-km intervals in a rectangular coordinate array with certain variations for practical reasons. Twenty-six measurements were made at each station during the year. Sampling sequences and data processing procedures are explained. Results of this study are tabulated and maps showing SO_2 emission parameters are presented.

12604

Larsen, Ralph I., William W. Stalker, and Charles R. Claydon

THE RADIAL DISTRIBUTION OF SULFUR DIOXIDE SOURCE STRENGTH AND CONCENTRATION IN NASHVILLE. Preprint, Air Pollution Control Assoc., Pittsburgh, Pa., 6p., 1961. 7 refs. (Presented at the Air Pollution Control Association, Annual Meeting, 54th, New York, June 11-15, 1961, Paper 61-8.)

In 1958-59, the Public Health Service and the School of Medicine of Vanderbilt University conducted a study in Nashville, Tennessee, to investigate possible relationships between air pollution and health and to obtain information on a number of the engineering and meteorologic phases of air pollution. Sulfur dioxide was studied intensively, from a detailed emission inventory to ambient air measurements using several sampling techniques. Seasonal Source strength and ambient levels of SO_2 reported in terms of sulfation, using lead peroxide candles, are discussed as a function of radial distance from the center of Nashville. A simple mathematical model is presented to relate the emission pattern to the resulting sulfation pattern.

13422

Lahmann, Erdwin and Karl-Ernst Prescher

HYDROGEN SULFIDE DETERMINATION IN AIR WITH AUTOMATIC SAMPLING. (Schwefelwasserstoff-Bestimmung in Luft mit automatischer Probenahme.) Text in German. Wasser Luft Betrieb, 12(9):529- 531, Sept. 1968. 9 refs.

A simple procedure is described for H_2S determination based on photometric measurement of methylene blue formed in the reaction of H_2S with dimethyl-p-phenylenediamine in the presence of Fe(III) chloride. Samples of atmospheric air are passed through an alkaline cadmium hydroxide suspension which blinds the H_2S present as cadmium sulfide. Its usefulness for determination of the H_2S content of contaminated air can be enhanced by automatic sampling with the aid of a commercially available control device with 12 standard impingers. However, the following conditions must be met: (1) the cadmium hydroxide suspension in the impingers must be freshly prepared in order to maintain its absorption capacity for at least 24 hrs; (2) the cadmium sulfide suspension formed upon sampling must remain stable for at least 24 hrs; and (3) the volume of the air sample must be measured with sufficient accuracy. Tests designed to find out whether these requirements can be met gave positive results. In addition, tests to determine the cross-sensitivity of the H_2S determination to SO_2 and NO_2 showed that it is not perceptibly affected by the presence of 1 mg/cum of SO_2 or NO_2 in the air sample. However, in the presence of these quantities of SO_2 and NO_2, the cadmium sulfide content of the absorption suspensions was lowered by about 20%. This effect could be leiminated by adding 5 ml of a 1.2% solution of ammonium amidosulfonate to 400 ml of the alkaline cadmium hydroxide suspension.

13953

Lindberg, Walter

AIR POLLUTION IN NORWAY. III. CORRELATIONS BETWEEN AIR POLLUTANT CONCENTRATIONS AND DEATH RATES IN OSLO. (Den alminnelige luftforurensning i Norge. III. Korrelasjoner mellom luftforurensninger og dodelighet i Oslo.) Translated from Norwegian. Oslo Univ. (Norway), p. 78-102, 1968. 92 refs.

Extensive data are presented to show the correlation of air pollution in Oslo, Denmark and death rates. The data include causes of death, types of pollutants, SO_2 concentration, and meteorological factors. The results indicate a casual connection between mortality and air pollution. More investigations are recommended.

14482

Rokushika, I., M. Aoyama, and Y. Murai

SEASONAL AIR POLLUTION IN HEIGHT AT A TALL APARTMENT HOUSE. (Koso apart no kaiso betsu, kisetsu betsu taiki osen jokyo). Text in Japanese. Nippon Eiseigaku Zasshi (Japan J. Hyg.), 24(1):97, April 1969.

Average temperature, sulfur oxides, dust fall, ammonia, and chloride ion were measured at the second, third (7.7 m), sixth (15.6 m), ninth (23.6 m), twelfth (31.5 m), and fifteenth (40 m) floors at a 15-story apartment building in Nagoya. Sulfur oxides were determined by the lead peroxide method. For the last three pollutants, samples were obtained by hanging white cotton cloths under the eaves for 30 days. After exposure, dust fall was determined by reflectance, and ammonia and chloride ion were determined by analysis of the distilled water used to wash the cloth. Average temperature tended to be higher at the 15th floor in any season. Sulfur oxides were most concentrated at the 2nd floor (0.64-0.73 mg/100 sq cm/day) and were highest in winter and fall. Dust fall was greatest in winter on the 9th floor level. Ammonia was highest in the summer, 1.57 mg/30 days/400 sq cm. Chloride ion was also most concentrated in summer (2.27 mg/30 days/400 sq m). Air pollutants were generally more concentrated at the middle floors of the apartment building.

14534

COMMISSION ON EARTH, WATER AND AIR, ROTTERDAM. Annual Report 1968. (Verslag over het jaar 1968). Text in Dutch. 72p.

This report deals with the soil, water, and air pollution problems in the vicinity of Rotterdam. Thirty-three cases of soil pollution reported in 1968 were mainly due to leakage in underground tanks and pipes. The average chlorine content at low tides at the measuring station of the Horingerdijk reservoir was 139 mg/l, 7 mg/l lower than in 1967. The level of air pollution during 1968 was more or less constant in comparison with 1967. A study of the 1218 bronchitis complaints of male civil servants indicated that bronchitis occurs with increasing frequency in the age group above 40 and especially above 60. A study of chronic bronchitis and asthma in elementary school children in two sections of Rotterdam indicated that in Crosswijk, 5.5% of 455 children had chronic bronchitis and 2.2% had asthma. In Hillegersberg, 1.0% of 480 children had chronic bronchitis and 1.7% had asthma. Measurements of precipitation, smoke, polycyclic hydrocarbons, CO, ozone, NO_2, and sulfur oxides are presented. The smoke meter results show a usual smoke content of 100 micrograms/cu m or more during long periods of mist which occur during the winter months. In the first and fourth quarters, the polycyclic hydrocarbon values were much smaller than those of 1964. Of 174 samples of carbon monoxide, 18 were more than 30 ppm; in 1967, only one sample was higher than 30 ppm. The highest lead content was 1.5 micrograms/ cu m. Ozone content of the air was less than 20 micrograms/cu m on cloudy days. Nitrogen oxide concentration ranged from 100- 150 micrograms/cu m. Ninety-one days were recorded with SO2 content equal to or greater than 350 micrograms/cu m, and 89 days were recorded with smoke content equal to or greater than 250 micrograms/cu m. The declining tendency for smoke pollution was attributed to the increasing use of natural gas.

16017

Kurtzweg, J. A. and D. W. Weig

DETERMINING AIR POLLUTANT EMISSIONS FROM TRANSPORTATION SYSTEMS. Preprint, Association for Computing Machinery, New York, N. Y., 22p., 1969. 18 refs., (Presented at the Association for Computing Machinery, Symposium on The Applications of Computers to the Problems of an Urban Society, New York, Oct. 24, 1969.)

Internal combustion vehicles are a source of five major air pollutants: carbon monoxide, hydrocarbons, nitrogen oxides, particulates, and sulfur oxides. Because vehicular pollution is essentially a problem of urbanization, analysis of its source must be carried out on a metropolitan or smaller scale. A method is presented for estimating the quantity and spatial distribution of motor vehicle emissions in a metropolitan area from established speed-emission relationships and transportation study data. On-the-road sampling of exhaust emissions from a representative sample of automobiles indicates there is a consistent relationship between average route speed and the quantity of carbon monoxide and hydrocarbons emitted. Metropolitan transportation study agencies developed detailed descriptions of future street and highway networks. The Seattle, Washington, metropolitan area was selected for the initial application of the vehicle emission estimation method because of the transportation characteristics of the area and the nature of the transportation study data available. Emissions are calculated for two 1985 street and highway networks, one based on the land use pattern predicted if existing trends within the region continue, and one based on a pattern which will exist only if certain development policies are implemented. The calculated vehicular emissions and estimated emissions from nonvehicular sources can be used with a meteorological diffusion model to predict future air quality. (Author abstract modified)

16087

Leithe, W. and A. Hofer

DETERMINATION AND OCCURRENCE OF SMALL CONCENTRATIONS OF N2O IN WASTE GASES, IN THE AIR AND IN WATER. (Ueber die Bestimmung und das Vorkommen niedriger Konzentrationen von Distickstoffoxid in Abgasen, in der Luft und in Waessern). Text in German. Allgem. Prakt. Chem. (Vienna), 19(3):78-79, March 1968. 7 refs.

A new method for the analysis of low N2O concentrations is briefly outlined. The method is a form of gas-liquids-chromatography (GLC) with separating columns made of propylenecarbonate- glutaronitrile on Sterchamol. With the aid of a hot wire detector, 50 ppm N2O in 10 ml gas samples can still be determined with accuracy. Using this method, the formation of N2O was studied at the combustion of NH3-air mixtures over platinum- rhodium and the N2O concentration in the waste gases from nitric acid scrubbers was determined. Concentrations of 400 to 900 ppm N2O were found in the combustion gases, and of about 200 ppm in the waste gases before it was blown into the air. To adjust the GLC method to the determination of low N2O concentrations (e.g. 0.2 ppm), a concentration method was devised in which a concentration column filled with silica gel was activated at 160 C, making it possible to determine the concentrations usually found in the atmosphere. Analysis performed with this method in the vicinity of Linz (Austria) showed concentrations of 0.23 plus or minus 0.04 ppm. The N2O concentrations in various rivers and in drinking water were also determined. The apparatus is illustrated and a step-by-step account of the procedure is given.

16345

Biersteker, K.

POLLUTED AIR. ORIGIN, MEDICAL SIGNIFICANCE AND COMBATING OF POLLUTED OUTSIDE AIR. (Verontreinigde Lucht. Ontstaan, medische betekenis en bestrijding van verontreinigde buitenlucht). Assen, Van Gorcum, 1966, 214p., 339 refs. Translated from Dutch. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 275p., July 29, 1969.

Factors affecting emissions are considered, together with trends in emissions in the Netherlands and Rotterdam. The qualitative and quantitative significance of air pollutants as potential disease agents in Rotterdam is evaluated. The maximum sulfur dioxide concentration so far recorded in Rotterdam is 1600 micron cu m; the maximum smoke concentration, 500 micron/cu m. No epidemiological significance is attributed to measured concentrations of fluorides, nitrogen dioxide, carbon monoxide, or lead. Concern is shown for the role of benzpyrene and other carcinogens in the etiology of lung cancer. Distinctions are made between acute, sub-acute, and chronic air pollution. During acute air pollution, SO2 and smoke concentrations in Rotterdam show five- fold increases. Sub-acute pollution occurs when wind speeds drop below 2 m/sec. Chronic air pollution is present on all other days, especially in winter. Though the effects of pollution can also be categorized as chronic, acute, and sub-acute, the level of air pollution is still too weak to cause illness. Methodologies employed in determining the relationship between air pollution and human mortality and morbidity are reviewed, and hypotheses developed to describe the effects of pollution on illness and death in Rotterdam. Refinements in analytical methods are urged so that the factors influencing increased chronic nonspecific lung disease mortality and lung cancer mortality can be identified. It is also suggested that emission standards be supplemented by regulations making it possible to restrict emissions when meteorological data and monitoring station readings point to certain dangers.

16401

Guderian, Robert and Heinrich Stratmann

OUTDOOR EXPERIMENTS ON THE EFFECT OF SO2 ON VEGETATION. III. LIMITS OF SO2 EMISSIONS HARMFUL TO FRUIT AND FOREST CULTURES, AS WELL AS TO AGRICULTURAL AND GARDAN PLANTS. (Freilandversuche zur Ermittlung von Schwefeldioxidwirkungen auf die Vegetation. III. Teil. Grenzwerte schaedlicher SO2 Immissionen fuer Obst-und Forstkulturen sowie fuer landwirtschaftliche und gaertnerische Pflanzenarten). Text in German. Forschungsber Landes Nordrhein- Westfalen, no. 1920, 114p., 1968. 30 refs.

After extensive preliminary studies of the emissions and of the atmospheric pollutant concentrations in the vicinity of an iron-ore roasting plant, six sites with comparable climatic growth conditions and staggered air pollution concentrations were selected to test the injurious effects of SO2 on rye, wheat, barley, rap, potatoes, alfalfa, clover, or tomatoes, etc. as well as on oaks, beeches, spruces, pines, firs, and on cherry, apple and plum trees. Five stations were within the range of the SO2 emission source, while the sixth (control) station was outside the area. All plants and trees were grown in wooden containers to assure the same soil conditions. The SO2 content was measured continuously during 1959-61. Criteria for injuries to forest trees were the number of shoots and the amount of circumferential growth; criteria for fruit trees and field and garden crops were fruit quality and the yield. The reactions observed on all plants are presented in the form of tables and graphs. A differentiation is made between actual injuries, injuries probably caused by air pollution, and possible injuries. The highest value at which no symptoms were observed and the threshold value to visibly harmful SO2 were determined. It was found that barley, summer wheat, summer rap, tomatoes and beets could by grown at average SO2 concentration of 0.59 ppm (0.141 ppm during the measured period), but not fruit trees, forest trees, alfalfa, clover, spinach or winter rye, etc. Fruit trees began to grow at SO2 average concentrations of 0.26 ppm. Spinach was most sensitive to SO2.

16495

Mitrovic, Ljiljana, Lj. Simeonov, and H. Udzvarlic

AIR POLLUTION AND CHRONIC BRONCHITIS IN SARAJEVO. (Aerozagadenje i hronicni bronhitis u sarajevu). Text in Croatian. Med. Arhiv., 22(1-2):31-43, 1968. 14 refs.

The degree of air pollution and the prevalence of chronic bronchitis in Sarajevo was determined. Measurements of sulfur dioxide and fumes at three locations showed that there was a high degree of pollution in the center of the town. The peak concentration was in January and the lowest was in July. The prevalence of bronchitis was determined with questionnaires. Two groups of the population were included, the first being in the polluted part of town, and the second in the relatively clean part of town. Each person lived for 5 years in the area. The results for 663 males were tabulated according to the place of residence, age, and smoking habits. The rate of chronic bronchitis was 11-15% in the 25-34 age group, and 32% in the 45-54 age group. Smokers suffered chronic bronchitis more than non-smokers. There was no significant differences between prevalence rates in polluted and non-polluted areas. It was concluded that the prevalence rate is not an exact measure in determining the role of air pollution in causing chronic bronchitis. A long term investigation was recommended. (Author summary modified)

16664

Materna, J.

PRELIMINARY RESULTS OF SYSTEMATIC MEASUREMENTS OF THE CONCENTRATIONS OF SULFUR DIOXIDE IN THE ATMOSPHERE ABOVE THE KRUSNE HORY AREA. (Prvni vysledky soustavneho mereni koncentraci kyslicniku siriciteho v ovzdusi v oblasti Krusnych hor). Scientific and Technical Society, Prague (Czechoslovakia), Agriculture and Forestry Section, Proc. Conf. Effect Ind. Emissions Forestry, Janske Lazne, Czechoslovakia, 1966, p. III-1 to III-16. 6 refs. (Oct. 11-14.) Translated from Czech. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, April 24, 1969.

The existence of fundamental differences and discrepancies in the data on toxic concentrations of sulfur dioxide has led to a program to investigate the relationships between concentration and injury in a series of experiments with the effects of fumes on older spruce seedlings and seedlings of other woody plants; and of utilizing the data obtained from the established network of stations for the automatic recording of sulfur dioxide in the atmosphere of the forests in Krusne hory. The network is partially linked to the extensive control system in the area below Krusne hory, the Podkrusnohori, and in communities in Krusne hory. The purpose of the measurements were as follows: establish the range of SO2 concentrations in this area; compare the measurements with the degree of damage, especially in the old spruce stands; and measure the trends in SO2 concentrations in the area under influence of emissions. A network of four analyzers furnished continuous measurement data obtained at one-minute intervals, showing values of SO2 concentrations in the atmosphere expressed in mg/cu m air. Results of two of them are presented for preliminary evaluation. Results are summarized in tables and suggest the following conclusions: (1) concentrations of sulfur dioxide causing injury to forest plants in both localities are lower than the limits of toxicity presumed so far; and (2) maintenance of levels not exceeding the acceptable level did not protect the spruce stands from injury.

16673

Stein, G.

REGIONAL DIAGNOSES OF SMOKE DAMAGE IN THE FORESTS OF KRUSNE HORY, CONDUCTED BETWEEN 1964 AND 1966, AND THEIR RESULTS. (Metoda velkoprostorove diagnosy kourovych skod v lesich Krusnych hor, uskutecnena v letech 1964-1966, a jeji vy-sledek). Scientific and Technical Society, Prague (Czechoslovakia), Agriculture and Forestry Section, Proc. Conf. Effect Ind. Emissions Forestry, Janske Lazne, Czechoslovakia, 1966, p. VII-1 to VII-16. 15 refs. Translated from Czech. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 17p., April 1969.

Investigations of smoke damage in the Annaberg, Marienberg, Freiberg, Tharandt, and Pirna National Forests of Czechoslovakia from 1964 to 1966 are described; spruce covered 85% of the area surveyed. Analysis of tree rings by borings showed a significant decrease in growth rates of spruce stands in the last 10 years. Spruce fascicles were shown to have the ability to store sulfur, but no relationship to the degree of tree damage was established. Analysis of the fluorine content in bark and of variations in acidity of the humus layer were also carried out, the degree of acidity does not appear to be correlated with the degree of injury. Trace elements found in the humus were in concentrations too small to be phytotoxic. A survey of existing and planned emission sources was made, including nearby areas of Germany, and a permanent network of 12 measurement stations for continuous atmospheric samplings of sulfur dioxide and dust was established along the border between Fichtelberg and Elbe; the stations will also make relevant meteorological observations.

17712

Son'kin, L. R.

ANALYZING METEOROLOGICAL CONDITIONS OF HAZARDOUS AIR POLLUTION IN CITIES. (Analuz meteorologicheskikh uslobiy opasnogo zagryazneniya vosdukha v gorodakh). Text in Russian. Tr. Gl. Geofiz. Observ. (Leningrad), no.234:60-68, 1968. 25 refs.

Data gathered from several cities are used to examine synoptic situations related to strong and weak air pollution conditions. Special attention is given to the repeatability of three types of synoptic situations, designated as follows: 1) gradientless baric field; 2) intermediate field; 3) cyclone, as recorded at three fixed points in Magnitogorsk. Studies were based on sulfur dioxide and dust measurements and may be used to predict the distribution of impurities in city air under stagnation conditions. The results presented have been and will continue to be used to assure air purity in Soviet cities.

19433

Bravo, H. and L. Corona T.

ATMOSPHERIC CONTAMINATION AND ITS RELATION WITH VEHICULAR FLOW IN MEXICO CITY. Universidad Nacional Autonoma de Mexico, Mexico Cit Facultad de Ingenieria, 1969. 7 refs. Translated from Spanish. Belov and Associates, Denver, Colo., 27p., March 12, 1970.

A study was conducted to determine the degree of contamination expected in the air over Mexico City during the period of the 19th Olympic Games. Measurements were conducted through November 1968 in order to establish immediate comparison with the Olympic period. Recognizing that vehicular activity would be greatest in the areas adjacent to the games and other tourist attractions, the study attempted to obtain a correlation between the number of vehicles in circulation and the degree of contaminant concentration. At the same time, meteorological parameters that influence concentrations were measured. A set of analyses made on air filter samples during October and November 1968 is presented. Concentration of carbon monoxide and methane in the air samples and the total of suspended particulate matter and lead in the filters was also obtained. The concentrations of detected contaminants were correlated with transit parameters (velocity, flow, and vehicle concentration), taking into account the residual variables relative to meteorological phenomena. A regression equation to compute ppm carbon monoxide as a function of temperature, vehicle flow, and the amount of methane was derived. Contaminant concentrations indicated that a critical condition exists in Mexico City.

19445

Stratmann, H. and H. Ixfeld

SULFA-DIOXIDE IMMISSION MEASUREMENTS IN THE REGION NORDHEIN-WESTFALEN FROM NOVEMBER 1, 1967 TO OCTOBER 31, 1968. (SIC). Schriftenreihe Landesanstalt Immissions-und Bodennutzungsschutz Landes Nordrhein-Westfalen (Essen), no. 16: 1-7, 1969. 11 refs. Translated from German. Belov and Associates, Denver, Colo., 13p., Feb. 1969.

In large areas of North Rhine Westphalia, especially along the heavily industrialized areas of the Rhine and Ruhr Rivers, measurements were performed to determine the distribution of sulfur dioxide emissions. Measurements were made at 5280 locations in accordance with a statistical plan. Emission distributions for the entire supervised region are presented on maps. Comparisons of current values and values obtained in previous years are presented for the Ruhr Valley and selected towns and counties. The trend indicating a continuous decrease in sulfur dioxide emissions for most cities and counties of the region which was observed during previous measurement periods was not continued during the 1967-1968 period. While 23 cities and counties continued to decrease, 23 others showed increases. All cities and counties in the western and southern sections showed an increase of about 10%. The counties of Kempen-Krefeld, Rees, and Dinslaken showed increases of about 20%. The program of air quality monitoring will continue during 1969.

21103

Stratmann, H.

FIELD EXPERIMENTS TO DETERMINE THE EFFECTS OF SO2 ON VEGETATION. PART II: MEASUREMENT AND EVALUATION OF SO2 GROUND LEVEL CONCENTRATIONS. (Freilandversuche zur Ermittlung von Schwefeldioxydwirkungen auf die Vegetation. Part II: Messung und Bewertung der SO2-Immissionen). Forschungsber. Landes Nordrhein-Westfalen, no. 1184, 69p., 1963. 19 refs. Translated from German. CEGB Information Services, London (England), 58p.

As part of a project to determine levels of sulfur dioxide safe for plants, six stations were established in the vicinity of an iron mine and stocked with agricultural and silvicultural plants. Sulfur dioxide concentrations were measured continuously with an electroconductivity analyzer. The calculations required to identify constantly varying ground level concentrations in terms of parameters defining mean concentration, concentration-time- intergral, variations in concentration, frequency of recovery periods, and frequency of concentration peaks are described. Because of their importance in relation to the onset of pollution effects, five weighting factors were formed from the individual parameters which characterized the pollution conditions. These in turn were reduced to a single degree of hazard comprising those parameters most important to characterize pollution with respect to its effects on plant response. The mathamatical/statistical analysis of the degrees of hazard indicated that with this characterization, the pollution conditions at the individual experimental stations could be differentiated. Although the components of the hazard from SO2 can be characterized by means of the degree of hazard, it is not yet possible to draw definite conclusions about the onset of damage to the plant from the degree of hazard. The data from the extensive statistical analyses of SO2 measurements at the six stations are presented. (Author conclusions modified)

21126

Lux, H.

ESTIMATION OF THE PROPORTION OF TOTAL DAMAGE CONTRIBUTED BY EACH OF SEVERAL SOURCES OF STACK GASES WHICH SIMULTANEOUSLY AFFECT FOREST VEGETATION. (Prispevek k vymezeni podilu skod zdro ju kourovych plynu, soucasne pusobichich na lesni vegetaci). Scientific and Technical Society, Prague (Czechoslovakia), Agriculture and Forestry Section, Proc. Conf. Effect Ind. Emissions Forestry, Janske Lazne, Czechoslovakia, 1966, p. IV-1 to IV-10. 9 refs. (Oct. 11-14.) Translated from Czech. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, April 24, 1969.

A method used in the evaluation of assessment for industrial plants causing smoke damage to exhausts is reviewed and described. When exhausts differ chemically, it is better to limit the proportions by air analysis than from damage symptoms. A local-terrain diagnosis is necessary. Conversely, the enumeration of emissions is a procedure which offers favorable results at comparatively little cost, particularly in the case of large damaged areas and numerous emission sources. A large-scale diagnosis was carried out in the Dubner Heide area affected by factories in the vicinity of Bitterfield. The procedure is described. Calculations using this method show an error of plus five percent for a straight-line polygonal test pattern. Emission maps of eight most important large-scale emission sources in the Bitterfield area were used in order to calculate their share of the damage in the zones of the forests at Rossau, Dubner Heide, and Torgau. The results are tabulated. The percentage shares are shown separately for each zone of damage. The mean heights of stacks and sulfur dioxide values show that factories with the highest rate of emissions usually contribute the greatest share. Low stacks and presence of forests always cause increased values, particularly in heavily damaged zones.

21219

Terabe, M. and M. Nagata

COMPARATIVE STUDY ON MEASUREMENTS OF SUSPENDED PARTICULATE MATTER USING THE FOUR KINDS OF SAMPLERS. Kuki Seijo (Clean Air - J. Japan Air Cleaning Assoc., Tokyo), 7(3):9-15, 1969. 12 refs. Translated from Japanese. Belov and Associates, Denver, Colo., 14 p., April 26, 1970.

The Cyclone-Hi-Volume Sampler, the High Volume Sampler, the Tape Sampler, and Digital Indicator were used to measure the suspended particulate matter in the surface air over Hawasaki City, Japan, between July 1968 and January 1969. Factors measured were as follows: total dust, respirable dust (less than 3.3 micron diameter), soiling index, and counts per hour (cph) as measured on a digital analyzer. Correlations were made among the results obtained. A high degree of relationship was observed among the results from the first three systems, but the digital analyzer showed poor correlation. This was attributed to the deposition of particles on the wall of the sampling duct. The increase in dust density observed in the winter readings is attributed to heating requirements superimposed upon the continuing industrial fuel burning requirements.

21239

Dikun, P. P. and I. I. Nikberg

INVESTIGATION OF ATMOSPHERIC POLLUTION WITH 3:4-BENZPYRENE IN THE VICINITY OF PITCH-COKE OVENS OF OBSOLETE PATTERN. Probl. Oncol. (USSR) (English Translation from Russian of: Vopr. Onkol.), 4(6): 32-38, June 1958. 6 refs.

The results of an analysis of three sets of samples taken from the vicinity of an obsolete pitch-coke oven, at various times, at various distances from the works, and at points lying at various directions away from it are given. The first series were of deposits of dusts; the second series were of sedimentation samples; and the third series were of aspiration samples. The analysis of all three samples showed that exceptionally large amounts of carcinogenic hydrocarbons, in particular 3,4-benzpyrene, escaped into the surrounding area. Subsequently, on special government instructions aimed at ensuring a healthy atmosphere, the coke ovens were equipped with special devices to provide additional combustion of exhaust gases. Analysis showed that after reconstruction of the coke ovens, atmospheric pollution in the vicinity of the pitch-coke works sharply diminished.

22537

Saruta, Namio, Nobu Ishinishi, Yasushi Kodama, Eisaburo Kokubu, and Yoko Shikatori.

AIR POLLUTION AND RELATED DISEASE OF INDUSTRIAL DISTRICTS IN NORTHERN KYUSHU. (Kita Kyushu kogyochiiki no taikiosen to mitsuinshippei no chosa kenkyu). Text in Japanese. Nippon Koshu Eisei Zasshi (Japan J. Public Health), 16(14):913-920, Nov. 15, 1969.

The results of long-term measurements of atmospheric pollutants derived largely from adjacent industrial sites in Northern Kyushu are reported in the form of tables and brief comments on related diseases, which are typically prevalent in industrial areas, although definite relationsip between those diseases and the air pollution are not conclusively demonstrated because of the lack of data on cigarette smoking. The northern parts of Kyushu are grouped to five districts and the five districts are also classifie by the regional differences; industrial, business, and residential. Each of the average values obtained from the measurements covering nine years shows the dust fall of 23.04 g/sq m /month at Yahata-ku, 21.19 g/sq m/month at Tobata-ku, 21.39 g/sq m/month at Wakamatsu-ku, 14.53 g/sq m/month at Kokura-ku, and 14.43 g/sq m/month at Moji-ku; with sulfur oxides by use of PbO2 method 0.619 mg/100 sq m/month at Yahata-ku, 1.045 mg/100 sq m/month at Tobata-ku, 1.011 mg/100 sq m/month at Wakamatsu-ku, 0.714 mg/100 sq m/month at Kokura-ku, and 0.637 mg/100 sq m /month at Moji-ku. Analysis of dust fall with respect to the type of area indicates a dust fall of 27.4 t/sq km/month in the industrial area, 18.35 t/sq km/month in the business area and 13.56 t/sq km/month in the residential area and with sulfur oxides of 1.060 mg/100 sq m/month, 0.745 mg/100 sq m/month, and 0.603 mg/100 sq m/month respectively. Analysis of the related diseases indicates that prevalences of chronic bronchitis, respiratory system disease, and eye diseases are found highest in the industrial area in accord with the level of atmospheric pollutants with some exceptions of bronchial asthma, nasal catarrh and lung cancer. In connection with lung cancer occurrences, 3,4-benzpyrene concentrations were also measured and tabulated.

24575

Just, Jan and Jadwiga Kelus

BERYLLIUM IN THE ATMOSPHERE OF FIVE SELECTED TOWNS IN POLAND. (Beryl w powietrzu atmosferycznym w 5 wybranych miastach w Polsce). Roczniki panstwowego zakladu higi., 20(6):631-638, 1969. 36 refs. Translated from Polish. Belov and Associates, Denver, Colo., 12p., Sept. 16, 1970.

The natural sources of beryllium are described, and some of the use to which it is being put are mentioned. Occuptional hazards related to beryllium include berylliosis and respiratory cancer. Maximum allowable concentration for beryllium is 1-2 micrograms/cu m/8 hrs. The ambient concentration of beryllium in 5 Polish cities is measured. Although the reported values are higher than comparable cities of other countries, the levels are still lower than the recommended maximums. Because of the lack of data regarding atmospheric concentrations in the surroundings of industrial coal-burning areas, intensive investigations are recommended. The sampling procedure used to measure the beryllium concentrations is described.

25094

Jost, Dieter

LOCAL CLIMATE WITH A LOW AIR EXCHANGE RATE IN THE AREA OF FRANKFURT/M. (Eine Austauscharme Wetterlage im Gebiet von Frankfurt/Main). Text in German. Staub-Reinhaltung Luft, 30(7): 296-298, July 1970. 5 refs.

Low wind velocity and stable atmospheric stratification prevailing in the area around Frankfurt/M. between December 2 and 10, 1962 caused elevated sulfur dioxide pollution which during 106 out of 216 hours exceeded 500 micrograms/cu m. During the period from October 6 to 24, 1969 similar weather conditions prevailed in the Frankfurt area, yet no noticeable increase in SO2 pollution was established. A detailed analysis of meteorological data taken during the 2 periods disclosed that while during the 1962 smog a distinct temperature inversion existed between Frankfurt and Kleiner Feldberg no comparable situation existed during the 1969 low pollution period. These observations indicate that stricter criteria must be drawn for the assessment of weather conditions of low air exchange rate.

26174

Stratmann, H. and H. Ixfeld

AN ARTICLE DEALING WITH SULFUR DIOXIDE EMISSIONS AND THEIR EFFECTS ON VEGETATION. (Schwefeldioxid-Immissionsmessungen im Lande Nordrhein-Westfalen). Schriftenreihe Landesanstalt Immission und Bodennutzungsschutz Landes Nordrhein-Westfalen (Essen), no. 13, 1968. 9 refs. Translated from German. Belov and Associates, Denver, Colo., 11p., Oct. 30, 1970.

In accordance with the Emission Protection Law of Northrhine- Westphalia, sulfur dioxide concentrations were determined at 5280 sites from November 1, 1966 to October 1967. The measurements were evaluated with reference to variable space with the aid of an electronic data processing system. The calculated emission magnitudes for 5026 unit surface areas, each 1 sq Km in size, were tabulated and illustrated in a topographic map. In addition, the freequency of occurrence of certain loading levels was determined for individual city and rural areas of the survey district. A comparison of the results with those of two other measuring years indicates that the loading has decreased in almost all districts. This report describes special investigations conducted for the first time for the purpose of determining changes of loading with respect to time; they were conducted for the heavily industrialized Ruhr area. This evaluation variable with respect to time indicates which changes in sulfur dioxide loading in urban and rural areas of the Ruhr occurred during the course of the third survey, and that the loading in all these districts has decreased. The supervision of sulfur dioxide emissions will continue until 1968.

27831

Noushi, Hiroshi, Takahiro Seto, Kyoji Yamazaki, and S. Izumigawa

ANALYSIS OF METALLIC COMPONENTS OF SUSPENDED DUSTS BY ATOMIC ABSORPTION SPECTROSCOPY AND THE RESULTS OF MEASUREMENTS CONDUCTED IN TOKYO. (Genshi kyukobunsekiho ni yoru fuyu jinaichu no kinzokuseibunbunseki ni taisuru jakkan no kento to tonai ni okeru sokuteikekka ni tsuite). Text in Japanese. Tokyo-toritsu Eisei Kenkyusho Kenkyu Hokoku (Rept. Tokyo-to Lab. Med. Sci.), no. 20: 115-118, 1968. 3 refs.

The concentrations of elements such as iron, manganese, nickel, lead, zinc, copper, chromium, and cadmium were measured in Tokyo. The apparatus used included a Perkin Elmer atomic absorption spectroscope and a Staplex hi-volume sampler. The data obtained from the measurements are tabulated and compared to the values obtained by the Ministry of Health and Welfare at Japan Environmental Sanitation Center using photo-emission spectroscopy. Considering the maximum allowable concentration of heavy metal elements in the environment as one-hundredth that of the working environment, calculations showed that lead was closest to the maximum allowable concentration. This is probably due to automobile exhaust emissions.

27839

Sato, Akira, Masanao Takahashi, and Tetsuo Kudo

STUDIES ON ATMOSPHERIC POLLUTION IN IWATE PREFECTURE. NO. 9. HEAVY METAL CONTENT IN SETTLING DUSTS. PART II. (Iwate-ken no kogai ni kansuru kenkyu. Dai-9-ho. Kokabaijinchu no jukinzokuganryo. 2). Text in Japanese. Iwate-Ken Eisei Kenkyusho Nenpo (Ann. Rept. Iwate Inst. Public Health), no. 12:71-99, 1968. 4 refs. PART I. Ibid., no. 12:44-70, 1968.

Results concerning the heavy metal components of settling dusts in the industrial districts of Iwate Prefecture are described (Kamaishi, Kuni, and Higashiyama), especially taking into account Ofunato, cement-producing town. The results obtained from the earlier investigations were re-examined, and toxic heavy metals in settling dusts were determined more expediently by means of the recently acquired atomic absorption spectroscope. Metallic components characterized the various areas(industries); of all toxic metals under scrutiny, copper and zinc were found in all areas. In Higashiyama, the amount of calcium contained in the urine of the residents (average of 660 mg/l) was much larger than that of the factory workers (530 mg/l). Further investigation of the toxic metals in settling dust is considered to be necessary in order to reveal their relationship with the biochemical effects on human health.

28648

Fukushima, Tetsuji, Takeshi Ohno, Katsumi Saruta, and Etsuo Yoneyama

THE DISTRIBUTION OF CARBON MONOXIDE IN THE URBAN AIR. (Issanka tanso no shigaichi ni okeru bunpu ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 5(1):224, 1970. (Proceedings of the Japan Society of Air Pollution, Annual Meeting, 11th, 1970.)

Carbon monoxide was sampled by means of a Mylar bag at a busy traffic intersection (12,000 cars/day) in Yokohama. Sampling was conducted at 36 locations within 100-m radius of the intersection. Carbon monoxide was then analyzed by a non-dispersive infrared analyzer. The maximum concentration was found not at the corner of the intersection, but at a location about 30 m away where traffic was most congested. The infiltration of pollution to the general area is such that in the upwind direction, the concentration is reduced to half within 30 m, whereas in the downwind direction, the distance is about twice as much. Another set of samples taken at the central location of Yokohama showed that when the carbon monoxide at ground level is only a few ppm in concentration, there is not much change in concentration up to about 14 m above ground. However, when the concentration is over 10 ppm, concentration is halved at the distance of about 10 m from the ground.

30378

Hashimoto, Michio

ON POLLUTION FROM CADMIUM OF MIKKAICHI SMELTERS, NIPPON MINING CO. (Nikko Mimmaichi seirensho no kogai to ni tsuite). Ministry of Health and Welfare, Tokyo (Japan), Public Nuisance Section, May 29, 1970.

In May, 1968, itai itai disease came to be recognized by the Minisry of Health and Welfare as originating in cadmium pollution. 0Cadmium pollution of the Mikkaichi Smelter was observed for the first time in September, 1969. After the investigation by the Ministry, the area around the Mikkaichi Smelter was designated as requiring observation. The data of the investigation, which lasted a month, showed that floating dust was 160 microgram per 1 cu m, which is less than in Osaka or Tokyo. Tokyo s was 200 microgram and Osaka s and Kawasaki s was 250-280 microgram, sometimes reaching 400-500 or even 1000. The average cadmium content in Kurobe around the smelter, for a month, was 0.31 microgram, per 1 cu m. The average for eight hours a day, or shorter periods, was three to five times as much. The Ministry based its interim standards on eight to 12 hours (0.9-2.9 microgram were standards), although guidance was given to comply with a lower figure than the standard. A recheck will be made by the Ministry, using the equipment of the Ministry. Very high cadmium concentration was found in the soil. In 1968, a few traces up to seven ppm, averaging three ppm was found in the soil. In 1969, an average of 14.9 ppm, from 4.4 ppm to 53 ppm was found; 53 ppm was higher than that of Annaka. There is no standard for cadmium in soil. It does not necessarily follow that the highe the cadmium content in soil, the higher the cadmium content in rice. Cadmium in the soil does serve as an indicator of the cadmium pollution of air. Before the smelter introduced a Cottrell electric dust collector, in 1960, pollution must have been greater. If a man ate 380 g of rice, containing 1.31 ppm cadmium ever day, he would be taking 0.5 mg per day from rice. In the area here, the people eat more than 0.3 mg. However, opinions vary as to how much is a dangerous concentration. X-rays showed that one had a positive result. Sugar and protein in the urine were lower in the people in non-polluted area. Of 24 people who had positive protein in the urine, 15 people s urine was analyzed for cadmium content. Per litre, there were 3.7-13 microgram, averaging 8.4 microgram, which is less than 30 microgram, thought to be the critical line by specialists. The residents in the Mikkaichi area can rest assured that there will never be itai itai disease case among them.

30708

Stratmann, D. and H. Ixfeld

SULFUR DIOXIDE IMMISSION MEASUREMENTS IN THE STATE OF NORDRHEIN WESTFALEN. Preprint, State Inst. for Emission in Nordrhein- Westfalen (West Germany), 15p., 1970. 8 refs. Translated from German.

Since 1964, sulfur dioxide emission measurements have been carried out in large sections of North Rhine-Westphalia, especially industrial centers in the Ruhr and along the Rhine, in accordance with the state s Emission Protection Statutes. Because of the size of the area and the number of measuring locations, the descriptive parameters of sulfur dioxide emissions are ascertained by random measurements in conjunction with spatial spot checking of unit surfaces one sq km in size. The results are reproduced in cartographic overviews (not included) and in tables (three of which are included). A clear increase in SO2 emissions was observed during the current (fifth) measuring year. This is in contrast to a constant decrease observed in earlier years. The trend toward higher emissions was confirmed by specialized comparative investigations of emission levels and their periodic fluctuations in the Ruhr district.

33072

Just, Jan, Stefan Maziarka, and Malina Wyszynska

ESTIMATION AND EFFECTS OF CARCINOGENIC MATERIAL IN AIRBORNE PARTICULATE MATTER COLLECTED IN SOME CITIES OF POLAND. I. CONTENT OF BENZO(A)PYRENE AND OTHER AROMATIC POLYCYCLIC HYDROCARBONS IN THE PARTICULATE MATTER OF AMBIENT AIR IN TEN POLISH TOWNS. (Badania skladu i wlasciwosci rakotworczych substancji zawartych w pyle zawieszonym w powietrzu atmosferycznym. Czesc I. Zawartosc benzo/a/pirenu oraz innych weglowodorow wielopierscieniowych w pyle powietrza atmosferycznego 10 miast w polsce). Text in Polish. Roczniki Panstwowego Zakladu Hig., 18(6):637-654, 1967. 20 refs.

The detree of dust pollution and the atmospheric level of polycyclic aromatic hydrocarbons considered to be carcinogenic (pyrene, benzo(a)pyrene, benzo(e)pyrene, and benzo(ghi)perylene) were investigated in ten large Polish towns situated in different climate regions. Air samples were collected at the town center at a height of 8-10 m three times a week, using a high-volume air sampler and filters of sintered glass. The filters were weighed and dust concentrations in the assayed air estimated. Extraction of the filters with benzene followed. The extracts were separated by column chromatography into appropriate fractions and spectrophotometrically determined. The 24-hr mean concentrations of dust were high, often exceeding the maximum allowable level of 200 microgram/cu m. The content of tar substances in the dust varied up to 20%, but was not correlated with dust levels. The content of aromatic polycyclic hydrocarbons in the air varied during 1966 in the following ranges: benzo(a)pyrene from 29-133 micrograms/1000 cu m, pyrene from 34-167 micrograms, benzo(e)pyrene from 14-80 micrograms, and benzo(ghi)perylene from 34-125 micrograms/1000 cu m. The lowest dust concentrations occurred during July and August; the highest concentrations, in winter.

36014

Suzuki, Yoshic

RELATION BETWEEN VISIBILITY AND AIR POLLUTION, ESPECIALLY FLOATING DUST, AT TOKYO INTERNATIONAL AIRPORT. (Tokyo kokusai kuko ni okeru shitei to taiki osen). Text in Japanese. Kenkyo Jiho (J. Meteorol. Res.), 23(8):283-319, 1971. 12 refs.

The relation between visibility and suspended particulates was investigated at the Tokyo International Airport for variation in diurnal, annual, and year-to-year trends. The occurrence of poor visibility (less than 800 m) has gradually been decreasing from year to year. Dynamical statistics on poor visibility for a five-year period are presented, including meso-scale weather map analyses for several poor visibility occasions. On the basis of aircraft observations of the slant visibility, a schematic model for the mechanism of concentration and diffusion of smoke emitted from factories is derived. (Author abstract modified)

36412

Vlodavets, V. V.

MOLD FUNGI IN THE AIR OF MOSCOW. Priroda (Moscow), no. 12:95-97, 1956. Translated from Russian. Fort Detrick, Fredrick, Md., Technical Information Div., 4p., July 1, 1968. NTIS, DDC: AD 673310

During 1955, a quantitative and qualitative analysis was conducted on the mold fungi in the air of Moscow. Samples were taken twice weekly, between two and three p.m. A total of 96 samples were taken. The two methods used for bacteriological analyses were Krotov s slit sampler and Koch s dish method. Each investigation consisted of seeding the air onto two dishes containing beer wort agar, both by the slit sampler and the sedimentation method. The air samples were taken at a height of one meter 20 centimeters above ground level. The determination of the number of colonies of mold fungi and their identifications was made after incubation of the Petri dishes for five days at 22-24 C. Of the mold fungi found in the air, those most frequently detected were Cladosporium, Penicillium, Alternaria, and Aspergillus. The mold-fungi spore content in the air is affected strongly by meteorological factors. The study showed that in the various seasons of the year, there are significant quantitative and qualitative flucuations in the content of mold-fungi spores in the air.

37306

Violet, P., G. Dumarchey, and F. Jourdan

AIR POLLUTION AND METEOROLOGY. (Pollution de l air et meteorologie). Text in French. Pollut. Atmos. (Paris), 13(51):201-207, July-Sept. 1971.

Carbon monoxide, carbon dioxide, sulfur dioxide, and dust measurements were taken in Lyon, France, on three days of exceptional pollution in Nov. 1970. Simultaneous meteorological observations revealed an important temperature inversion whose effects on the concentration and dispersion of pollutants are discussed. Although pollution level measurements may succeed in giving the first warning of a pollution episode, meteorological observations are necessary to describe the evolution of the episode and to give a forecast of its occurring at a certain time.

38481

Varkonyi, T. and M. Kertesz-Saringer

A SMOG SITUATION IN BUDAPEST ON JANUARY 22 AND 23 1970. (Eine smog-Situation in Budapest am 22 und 23. January 1970). Text in German. Z. Ges. Hyg. Ihre. Grenzgebiete (Berlin), 17(12):887-888, Dec. 1971.

Each year the air pollution in Budapest rises to particularly high concentrations three or four times during the months from November to February. One such condition prevailed on Jan. 22 to 23, 1970. The individual stages of the smog development were studied by means of the measurement of the sulfur dioxide concentration. Early in the morning of January 22, the SO2 concentration rose to 3.30 mg/cu m which is 16 times as high as the maximum allowable long-term concentration of 0.20 mg/cu m and five times as high as the maximum allowable short-term concentration of 0.60 mg/cu m. This extremely high concentration began to subside at 1 pm. The smog began to lift on January 23 at 9 pm. The average SO2 concentrations were measured again on January 25. Measurement of the nitrogen dioxide concentration by the Saltzmann method yielded the following data: on Jan. 22 at 10 am, 0.10 mgN02/cu m and at 8 pm 0.06 mg/cu m; Jan. 23 at 8.30 am, 0.05 mg/cu m, at 10 am 0.06 mg/cu m, and at 12.30 pm, 0.03 mg/cu m. The maximum concentration was measured on Jan. 22 at 5.30 am with 0.25 mgN02/cu m. The dust concentration rose likewise from 0.30 to 0.40 mg/cu m to 0.74 mg/cu m on Jan. 22 and to 0.84 mg/cu m on Jan. 23. The sick calls rose parallel with the SO2 concentration.

E. ATMOSPHERIC INTERACTION

02444

H. W. Georgii and S. Beilke

ATMOSPHERIC AEROSOL- AND TRACE-GAS-WASHOUT (FINAL SCIENTIFIC REPT.). Frankfurt Univ. (West Germany). Institut fur Meteorologie und Geophysik. 58 pp., Mar. 1966. CFSTI,DDC AD 634907

The results of detailed investigations in the laboratory on washout and rainout of SO2 by droplets of known size distribution and concentration are summarized. The results show clearly the effect of drop size, intensity and of the chemical composition (pH-value) of rain and fog on the scavenging efficiency. The results of the experiments were used as basis of a model calculation of the effect of washout and rainout by natural precipitation at a given vertical distribution of SO2. The circumstances under which the rainout and washout mechanisms respectively become predominant for the chemical composition of rainwater at the ground are demonstrated. (Author abstract modified)

05392

Slawson, P. R.

OBSERVATIONS ON PLUME RISE FROM A LARGE INDUSTRIAL STACK. Waterloo Univ., (Ontario), (Rept. No. NYO-3685-7.) (May 1966). 86 pp.

Careful photographic observations were made on the rise of smoke plumes from Lakeview Generating Station, Ontario and the results were compared with several theoretical formulae. Data relating to the stack variables were collected in some detail. In a neutral atmosphere a linear rising portion of the plume was found to occur beyond a specific transition point. Within the limited accuracy of the photographic technique, the observations confirmed the theoretical result that the height of the plume axis above the source varies as the two-thirds power of the distance downwind. Increased dilution tends to oppose plume rise but the direct effect of instability in the atmosphere is to promote rise; under these opposing influences it was found that in a dynamically unstable atmosphere the plume is sometimes above or below a corresponding plume in neutral conditions.

07179

G. Flemming

COMPUTATIONAL CHARTING OF RELATIVE VALUES OF SULFUR DIOXIDE IN THE NIEDERLAUSITZ INDUSTRIAL AREA. Rechnerische Kartierung von Schwefeldioxyd-Relativwerten im Industriegebiet Niederlausitz. Angew. Meteorol. (Berlin) 5(5):137-140 (1965). Ger.

A survey chart of the mean SO2 distribution over the Niederlausitz industrial area was established. The investigation was based upon the formula by Sutton as modified by Holland and Maede-Pasquill. Not only existing sources but also industrial emitters planned for this area were taken into account. Differences of height of terrain were taken into account. The computed chart is reproduced and some of its features are discussed. The effect of deposition is much more favorable in the Niederlausitz area with the smoke damages being less pronounced than on the Dubener Heide which was previously studied. Finally, smoke damage problems are discussed in general. Attention is drawn to the fact that strips of woodland can be quite effective in reducing damages to forests due to sulfur dioxide. This is due to a maxing action.

09537

Vadot, L., P. Belle, and J. Barbelon

STUDY OF POLLUTION WHICH STARTS AS UNIFORMLY DISTRIBUTED EMIS- SIONS. (QUALITATIVE AND EXPERIMENTAL ASPECTS OF THE PHENOMENA.) ((Etude de la pollution a partir d'emissions uniformement repart- les. (Aspect qualitatif et experimental des phenomenes.).)) Text in French. Pollu. Atmos.(Paris), 9(36):225-239, Oct.- Dec., 1967.

After discussion of several variable in the distribution of emissions, an aqueous model is described where a vat of NaC1 is permitted to emit a known quality of NaC1 with known density into a stream of pure water of known velocity. This model is considered to be analogous to the situation where smoke is emitted in urban or industrial situations, and the density of the salt solution is analogous to the thermal effect on plume behavior. In the first series of experiments, the salt solutions were emitted into water flowing at 0.95, 1.85, 4.25, or 5.95 cm./sec. and the results photographed. In a second series, a narrower surface area for the distribution of the salt solution was used. In a third series, the effect of a large source of thermal emission upon a smaller, upstream source of pollution was investigated. If the smaller source did not emit dense enough solution, the diffusion trail of that source fell into the trail of the larger, downstream source. The results are discussed and compared with those seen in nature with reference to the thermal effect of a large city and with reference to work done in Hyde Park on SO2 diffusion by the wind. Results are graphed, photographed, and drawn schematically.

10211

Berlyand, M. E., Onikul, R. I., and Ryabova, G. V.

THE THEORY OF ATMOSPHERIC DIFFUSION UNDER CONDITIONS OF FOG. ((K teorii atmosfernoi diffuzii v usloviyakh tumana.)) Text in Russian. Tr. Gl. Geofiz. Observ. (Leningrad), No. 207:3-13, 1968. 15 refs.

Relationships for atmospheric diffusion in various weather situations are important for studying the possibilities of reducing air pollution from industrial emission sources. It had been observed that the effect of air pollutants is more pronounced in the presence of fog. The interaction between the fog and the pollutants is complex and involves absorption of pollutants in the water droplets, aerosol formation, chemical reactions, etc. In the present study a mathematical analysis was made of the propagation of gaseous air pollutants in the presence of fog over a river. The equation for turbulent diffusion was solved and an expression was derived for the absorption of a pollutant by the water droplets as a function of droplet diameter, water concentration, and molecular diffusivity. The air pollutant concentration profiles and transfer coefficients were calculated in altitudes of 2-80 m. over a 700 m. wide river and the adjoining shore area at 20-90% humidity and wind velocity of 0.5 m./sec. The calculations were made under the assumptions that the turbulence over the river is equal or higher than over the shore, and the river surface does or does not absorb pollutants. Concentration profiles in presence of a temperature inversion were also calculated for an emission source 100 m. high and a wind velocity of 2 m./sec. It was shown that the pollutant concentration decreased in all layers due to absorption by droplets in the fog. The fog was shown to accumulate pollutants from higher levels. The results are applicable to SO2. Oxidation of SO2 to sulfuric acid and the formation of smog are discussed.

10217

Dunskii, V. F.

PRECIPITATION OF AEROSOL INTRODUCED INTO THE ATMOSPHERE IN THE FORM OF A VERTICAL TURBULENT JET. (Osedanie aerozolya, vvodimogo v atmosfery v vide vertikal'noi turbulentnoi strui.) Text in Russian Tr. Gl. Geofiz. Observ. (Leningrad), No. 207:215-222, 1968. 8 refs

Usually only the productivity of the source is considered in the theory of diffusion of aerosols from a point source. In the presen study the precipitation of aerosol from a vertical jet is analyzed means of semi- empirical theories of convective diffusion and turbulent jets. The experimental data used in the theory were obtained with different types of aerosol generators used in agriculture. The experiments were conducted for 6 to 20 hours by spraying transformer oil, solar oil and shale oil. The generator wa truck-mounted and moved at a speed of 4-6 km./hr. perpendicularly t the wind direction. The Aerosol was collected in cuvettes and on glass plates coated with zinc stearate. The precipitation of individual droplet size fractions was studied individually and as a poly- disperse mixture. The proposed method for calculating the precipitation characteristics of aerosol sprays was found to give results which were in good agreement with experiments.

10219

Gil'denskiold, R. S., B. B. Goroshk/, G. A. Panfilova and B. V. Rikhter

RESULTS OF EXPERIMENTAL OBSERVATIONS OF AIR POLLUTION IN THE RE- GION OF THE MOLDAVA THERMAL ELECTRIC POWER PLANT. (Rezul'taty eksperimental'nykh issledovanii zagryazneniya atmosfery v raioie moldavskoi GRES.) Text in Russian. Tr. Gl. Geofiz. Observ. (Leningrad), No. 207:65-68, 1968. 7 refs.

A previously proposed method for calculating the dispersion of fly ash and sulfur dioxide from smoke stacks of power plants was verifi by measurements made in the vicinity of the Moldava thermal power plant equipped with 180 m high, 6 m diameter stacks. The SO2 concentrations were measured at wind velocities from 2 to 6 m/sec a distances up to 9 km from the emission sources. Also, meteorologic parameters at the time of the measurements were determined. The maximum SO2 concentration calculated by a previously proposed formu amounted to 0.26 mg/cu m and the dangerous wind velocity to 2.5 m sec. The calculated and experimental values were in good agreement The height of the smoke plume above the stack was measured and correlated with the wind velocity. A previously proposed formula f calculating the smoke plume height was modified to give more accurate results.

10220

Goroshko, B. B.

SOME PECULIARITIES OF THE PROPAGATION OF POLLUTANTS FROM HIGH SOUR CES, DEPENDENCE UPON SYNOPTIC-METEOROLOGICAL FACTORS.(Nekotory osobennosti rasprostraneniya vrednykh primesei ot bysokikh istochnikov v zavisimosti ot sinoptiko-meteorologicheskikh faktorov Text in Russian. Tr. Gl. Geofiz. Observ. (Leningrad), No. 207:69-7 6 refs.

Experimental data on SO2 concentrations obrained in the vicinity of a large thermal electric power plant with 100 m high stacks in t Shchekinsk region were processed to study relationships between meteorological conditions and air pollution. Graphs of SO2 ground concentrations up to 14 km from the sources were plotted under cyclone, anti-cyclone and intermediate conditions. SO2 ground concentrations at different distances from the sources were plotted as a function of temperature. Vertical SO2 concentration profiles versus temperature were also plotted at distances of 1, 2, 4 and 10 km from the source. Horizontal SO2 concentrations profiles as a function of wind velocity were obtained. The SO2 concentration on the ground was found to be at most only about 0.4 mg/cu m at a wind velocity of 0-2 m/sec, while at velocities of 3-6 m/sec it reached maximum of 1.8 mg/cu m at a distance of 4-8 km from the source. Th situation is explained by the effect of the wind on the direction o the smoke plume. Relationships between the turbulent transfer coefficient on the ground and the ground concentration were also studied. The ground concentration increased with increasing transf coefficient. Low transfer coefficients in winter were always accompanied by low SO2 concentrations. It appears that variations the transfer coefficient can be used for predicting air pollution.

10224

THE CONTENT OF SULFUR IN ATMOSPHERIC PRECIPITATIONS. (O soler- zhani sepy v atmosferiykh osadkakh.) Text in Russian. Tr. Gl. Geofiz. Observ. (Leningrad), No. 207:87-91, 1968. 6 refs.

Sulfur in atmospheric precipitations occurs in form of SO3, SO4 and Sions. However, in most analyses only the sulfates are determined. I the present study SO3 and SO4 ions were determined i rain and snow collected during winter and summer months. The SO3 content decreased within several days of storage in zero which is explained by oxidation of SO3 to SO4 and the decomposition of SO3 t SO2. The SO3 concentrations of fresh precipitations were generally much higher in winter than in summe. This is explained by higher concentrations of SO2 due to coal combustion and the higher solubility of SO2 in water at lower temperatures.

10229

Selitskaya, V. I.

ANALYSIS OF AEROLOGICAL CONDITIONS OF AIR POLLUTION IN SOME REGIONS OF EUROPEAN RUSSIA. ((Analiz aerologicheskikh uslovii zagryazneniya atmosfery v nekotorykh raionakh ETS.)) Text in Russian. Tr. Gl. Geofiz. Observ. (Leningrad), No. 207:188-201, 1968. 5 refs.

Comprehensive measurements of meteorological parameters were made at altitudes up to 500 m. in the Moldava and Cherepetskaya power plant regions. Mean temperature, humidity and wind velocity profiles, pulsating velocity components, and temperature gradients were determined. The results indicate that the daily variations of all parameters are substantial. Further studies should be conducted to obtain data on nocturnal variations to permit evaluation of the intensity and size of inversion layers.

10233

Son'kin, L. R.

SOME RESULTS OF SYNOPTIC-CLIMATOLOGICAL ANALYSIS OF AIR POLLUTION IN CITIES. ((Nekotorye rezul'taty sinoptiko-klimatologicheskogo analiza zagryazneniya vozdukha v gorodakh.)) Text in Russian. Tr. Gl. Geofiz. Observ. (Leningrad), No. 207:56-64, 1968. 18 refs.

Air pollution data collected by the Main Geophysical Observatory were analyzed to establish relationships between air pollution and the synoptic climatological situations in cities. Concentrations of dust and sulfur dioxide were plotted as a function of geographic location, season, month, synoptic situation and pressure anomalies. The analysis showed that there is a specific dependence between the synoptic situation (anticyclone, cyclone) and air pollution. Stationary anticyclones, which are usually accompanied by intensive air pollution, are characterized by weak winds, the absence of transfer in the lower layer (3-5 km.), and pressure inversions at 1-2 km. The main cause of air pollution under these conditions is the absence of removal of pollutants by horizontal transfer.

10235

Vorontsov, P. A.

A STUDY OF THE STRUCTURE OF THE AIR FLOW AS A FACTOR FOR THE TRANSFER OF AIR POLLUTANTS. ((Issledovanie struktury vozdushnogo potoka, kak faktora perenosa produktov zagryazneniya atmosfery.)) Text in Russian. Tr. Gl. Geofiz. Observ. (Leningrad), No. 207:138-154, 1968. 12 refs.

A study was made of the aerological parameters in the vicinity of six major Russian electric power plants. The pulsating velocity components, the wind velocity, the temperature, the humidity and pressure at altitudes up to 500 m. were determined by balloon probes and by aircraft. The frequency of gardations were tabulated. The turbulence coefficient was calculated and plotted as a function of altitude in the areas of the power plants. The basic characteristics of the air flow were also tabulated. The components of the turbulent energy were then calculated. Convection contributed most in summer and friction in winter. This was the first attempt to obtain turbulent energy balances by processing of data from aerostatic probing.

10310

M. E. Berlyand

FUNDAMENTAL PROBLEMS OF ATMOSPHERIC DIFFUSION AND AIR POLLUTION. ((Oxnovnye problemy atmosfernoi diffusii i zagryazneniya vozdukha.)) Text in Russian. Tr. Gl. Geofiz. Observ. (Leningrad), 218:295-307, 1967. 60 refs.

A state-of-the-art study is presented on atmospheric diffusion and air pollution. A total of 60 theoretical and experimental studies carried out by the Main Geophysical Laboratory are reviewed. The studies deal mostly with mathematical relationships describing the dispersion of air pollutants under different meteorological conditions. Some of the topics discussed include relationships for the turbulent transfer coefficient; equations describing turbulent diffusion of heavy pollutants; the effect of thermal stratification on turbulent transfer; dispersion studies based on experiments with smoke screens for crop protection; calculations of fog dispersion; and theoretical studies on the diffusion of carbon dioxide of pollutants emitted from high sources. The Main Geophysical Laboratory, in cooperation with the Leningrad Ship Building Institute, is studying the formulation of equations which describe the flow structure; experiments are carried out with a model of a hill in a wind tunnel. Comprehensive studies of air pollution from high smoke stacks have been carried out in the vicinity of power plants in Cherepetsk, Moldavia, and Shchekinsk. Methods for calculating air pollution from power plants have been developed and are used in the design of power plants. Recently, comprehensive studies of air pollution in cities have been conducted by a special department of the Laboratory.

10368

Berlyand, M. E.

METEOROLOGICAL PROBLEMS OF CLEAN AIR PROTECTION. ((Meterologicheskie problemy obespecheniia chistoty atmosfery.)) Text in Russian. Meteorol. i Gidrol. (Moscow), 1967(11):50- 62, 1967. 11 refs.

Causes and control of air pollution in Russia are discussed, as well as research in air pollution. Cement dust emitted in 1964 alone amounted to 1.5 million tons. Large heat and electric power plants are presently installing ash collectors which are 95% effective, but even the small percentage emitted causes significant pollution because of the sheer volume of burned fuel. Desulfurization equipment is lacking. The effect of pollution depends on volume of emission, but more importantly on distribution of the pollutant and meteorology. Ground level temperature and wind velocity measurements are no longer sufficient since so many emission sources are high above ground (200-300 m.). Meteorological studies at the Main Geophysical Observatory are dealing with the first several hundred meters of air and include the development of mathematical equations for atmospheric diffusion from tall emission sources as well as formulas for initial escape velocity of pollutants and for pollution concentration. When an air layer with a weakened turbulence is directly superimposed over the emission source, the concentration of the pollutant more than doubles, while if such a layer is 100-200 m. above the source, the concentration is much less. Results of practical research conducted near the three heat and electric power plants with the tallest stacks in Russia during the period 1961 through 1965, using ground-level and air-borne equipment, agreed with theoretical data and led to the compilation of 'Provisional methods of determining the dispersal in the air of emissions from stacks of electric power plants' which is being applied in planning new power plants. Regular pollution determinations were started in 50 larger cities beginning in 1966, mostly using automatic recording equipment. Results of research in several large industrial cities of the Ukraine, Urals and Siberia have shown that air pollution is greater in cities with unfavorable meteorological conditions; in most cases, pollution is more severe in summer than in winter.

11287

Fortak, H.

CALCULATED VALUES OF GROUND-LEVEL SO2 CONCENTRATIONS FROM EMISSION DATA. APPLICATION OF THE RELATIONS TO THE URBAN AREA OF BREMEN. Free Univ. of Berlin, Inst. for Theoretical Meteorology, 34p., Feb. 28, 1966.

An attempt is made to treat the problem of the determination of the ground-level SO2 concentration of industrial agglomeration areas with the aid of a model. The starting point of the study is the consideration that the ground-level SO2 concentration may be determined from the frequency distributions of the ground-level SO2 concentration the three parameters of this frequency distribution -- the mean, the mode and the 97.5% confidence limit on the side of high concentrations -- are used. The determination of the frequency distributions of the ground-level concentrations of many points of the industrial agglomeration area, as a function of the frequency distributions of the meteorological parameters, is carried out mathematically as follows: After drawing up a complete list of the emitters, a list which takes into consideration, separately, all individual emitters with an SO2 emission of more than 1 kg/hr, and also includes the emission of domestic fuels in a suitable manner, the super-imposed concentration field is calculated, as a function of the established frequency distributions of meteorological parameters, for each point of a grid, with the aid of a model which is based, for the individual sources, on GAUSS distributions of the concentrations. It was found that in the case of Bremen the influence of the individual (industrial) emitters on the parameters of the ground-level concentration is secondary to the influence of domestic fuels. In every case it became very clear that the ground-level SO2 concentration for a given period of time varies from point to point within the area under consideration, and that a mean concentration value, determined perhaps by measurement at a given point, is not suitable for the characterization of the SO2 ground-level concentration either for this point or for other points of the industrial agglomeration area.

11954

Senshu, Toshio

AN ANALYSIS OF THE SURFACE BOUNDARY LAYER IN A REGION OF LAND AND SEA BREEZE. Taiki Osen Kenkyu (J. Japan. Soc. Air Pollution), 1(1):46-54, 1966. Translated from Japanese. 31p.

A study of the dispersion conditions for waste gas in the coastal region consisted of an analysis of the land and sea breeze, and meteorological observations of the lower atmosphere (by means of a captive balloon) to determine the characteristics of the boundary layer which forms in the region of the land and sea breeze. The height of the boundary layer that formed in the region of land and sea breeze showed a distinct diurnal variation. At sunrise, the boundary layer was 300 m high. It had developed overnight by the land breeze. Between 9 and 10 am during the switch from land breeze to sea breeze, no boundary layer could be observed. The boundary layer began to build up again from a height of 50 m to 150 m when the sea breeze began to blow. The height of the boundary layer was in close connection with the atmospheric stability near the ground surface. The maximum height of 300 m was at neutral conditions; at stable or unstable atmospheric conditions, the height was always less. The roughness of the ground was large when the wind velocity was weak, while it suddenly decreased when the wind velocity became strong. It was about 20 cm at a wind speed of less than 1 m/sec and below 5 cm at a speed of more than 2 m/sec. The frictional velocity was one- tenth as large as the wind velocity at about 1 m above the ground.

11956

Ito, Shozo

TURBULENT DIFFUSION IN THE ATMOSPHERIC BOUNDARY LAYER WITH STABLE THERMAL STRATIFICATION. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), vol. 1:18-23, 1966. 6 refs. Translated from Japanese. 22p.

An attempt is made to develop a theory for predicting the growth in the thickness of a cloud which is diffusing in a leeward direction from a continuous point source. Neutral stratification is contrasted with nocturnal thermal stratification. With respect to leeward axial concentration and the thickness of a cloud adjacent to the earth's surface, the theory is compared with diffusion data obtained in experiments conducted on a flat topography. (Author abstract modified)

12349

Monin, A. S.

ON THE TURBULENT EXCHANGE ABOVE OCEANS. (O turbulentnom obmene nad okeanami). Doklady Akad. Nauk. SSSR, 175(4):819-822, 1967. 3 refs. Translated from Russian. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 8p.

The humidity of air exerts a considerable influence on the turbulent state of the lower layer of air above the ocean (as well as above very wet land areas). It affects the magnitude of the gravitational force in the first place; in the second place, at high moisture contents, air strongly absorbs radiation of long wave-lengths, so that the heat influx due to this process must be taken into account. The turbulent entropy flux in humid air is not proportional to the turbulent heat flux, as it is in dry air, but includes a turbulent flux of moisture as well. The latter has apparently been over looked up to now. Using analytical expressions incorporating terms representing the effect of moisture, as well as heat flux, energy, and momentum equations, expressions are derived characterizing the velocity, temperature and humidity profiles of the lower layer of air above the ocean; taking the statistical homogeneity of the undulating ocean surface into account and restricting them to steady-state conditions. Particular cases are considered in which the expressions for the dimensionless functions used to characterize the above profiles assumes forms which agree with experimentally determined profiles in these particular cases.

12792

Polster, G.

THE APPLICATION OF TURNER'S CLASSIFICIATION OF DIFFUSION CATEGORIES TO CENTRAL EUROPEAN CLIMATES. (Zur Anwendung der Turner'schen Klassifizierung der Diffusionskategorien in der mitteleuropaeichen Klimaregion). Kernforschungsanlage, Juelich (West Germany), Zentralabteilung Strahlenschutz Internal Rept. 9, 16p., 1969. 11 refs. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 19p., Aug. 26, 1969.

Turner's classification system for dispersion categories was developed to deal with questions of air pollution. It is based on hourly cloud observations conducted by weather bureaus on the radiation intensity figured out indirectly from the annual and diurnal variation of the sun elevation and on measurements of the wind speed. The system is built around the idea by Pasquill, according to which the atmospheric stability near the earth's surface is primarily a function of solar or terrestrial radiation proportional to the degree of cloudiness and the depth of the cloud layer. By including the amount of clouds and the height of the cloud layer, radiation changes are to some extent reflected by the system. The method can be programmed and fed into a computer. This method is applied to central European climates, and the results of the application are discussed.

13030

Harada, Akira

A METEOROLOGICAL ANALYSIS OF SO2 POLLUTION IN SUMMER IN OSAKA. (Osaka ni okeru natsu no aryusan-gas osen no kishyogaku- teki kaiseki rei). Text in Japanese. Kishocho Kenkyu Jiho (J. Meteorol. Res.), 21(1):37-40, Jan. 1969. 3 refs.

The concentration of SO2 pollution in Osaka was measured on July 15, 1966. Data were collected at 16 locations and meteorologically analyzed. The highest concentration of SO2 pollution was observed between 9 am and 1 pm. The heavy concentration during that period was caused by a build up from polluted sea wind followed by a similarly polluted land wind. It was apparent, therefore, that heavy SO2 pollution can be produced in summer despite the low stability of air pressures.

14044

Reidat, R.

DAILY VARIATION OF TEMPERATURE AT ALTITUDES OF UP TO 200 METERS AND ITS INFLUENCE ON THE DISTRIBUTIONS OF FLUE GASES ACCORDING TO AIR TEMPERATURE RECORDS AT THE LOWER ELBE RIVER NEAR STADE. (Ueber den taeglichen Gang der Lufttemperatur bis in 200 m Hoehe und sein Einfluss auf die Verbreitungen von Rauchgasen nach Registrierung der Lufttemperatur an der Unterelbe bei Stade). Text in German. Z. Meteorol., 20(9-10):310-317, 1968. 3 refs.

At the smoke stack of the Schilling power plant near Stade, Germany, air temperatures were recorded at ten altitudes between 2 and 200 meters. These records provide a means for studying temperature variation with altitude. On the basis of records made during the summer, the build-up of the nocturnal ground inversion can be studied. After sunrise, it disperses from the ground upwards. The course of this dispersion and its effect on the spreading of flue gases are followed. A few hours before sunset, a stabilization sets in at the high altitude and can first be observed when the good-weather cumulus clouds begin to dissolve. The course of this stabilization at the altitudes below 200 meters is estimated on the basis of changes of the temperature gradient at the various altitudes. After sundown and at the start of the negative radiation balance, there is again a build-up of the inversion from the ground upwards, while at the high altitudes, a temperature decrease continues for some time.

14825

Yeliseyev, V. S.

THE QUESTION OF HORIZONTAL SCATTERING OF IMPURITY IN THE ATMOSPHERE. (Voprosy atmosfernoy diffusii i zagryazneniya vozdukha). Tr. Gl. Geofiz. Observ. (Leningrad), no. 172:74-78, 1965. 11 refs. Translated from Russian. Foreign Technology Div., Wright-Paterson AFB, Ohio, Translation Div., p. 23-29, 1967. FTD-MT-24-186-67

The method of determination of the coefficient of horizontal diffusion according to a visible outline of smoke from industrial smoke stacks is discussed. Studies of atmospheric contamination in 1962-1963 in area of the Shchekino State Regional Electric Power Station determined the parameters of horizontal diffusion according to data of aircraft observations of the smoke plume. A total of 20 flights was made to a distance where the plume ended, a point where the concentration was considered equal to zero. It was found that the mean dispersion as a function of time varied from 0.1 to 0.2 depending on weather conditions, but its absolute value remained constant to a distance of 30-40 km from the source. The obtained data was compared with characteristics of horizontal diffusion by Sutton. The mean dispersion as a function of time was recalculated to the parameters used in other studies and found to be 0.1 to a distance of 25 km. (Author abstract modified)

16324

Podlaha, Miroslav

MODELLING OF ATMOSPHERIC DIFFUSION PROCESSES. (K modelovani procesu atmosfericke difuze). Text in Czech. Energetika (Prague), 19(12):489-492, 1969. 13 refs.

The conditions and assumption necessary for modeling atmospheric phenomena at a reduced scale in a wind tunnel were described by the equation of atmospheric diffusion. Tests showed that in modeling atmospheric phenomena, it was not necessary to strictly adhere to the Reynold's criterion and that it is the Lambda criterion which is decisive for this case. The Lambda criterion is derived from the equation for atmospheric diffusion which takes into account sources of contamination. (Author abstract modified)

16629

Szepesi, Dezso

METEOROLOGICAL CONDITIONS OF THE TURBULENT DIFFUSION OF ATMOSPHERIC POLLUTANTS IN HUNGARY. (Legszennyezo anyagok turbulens diffuziojanak meteorologiai foltetelei magyarorszagon). Az Orszagos Meteorologiai Intezet Hivatalos Kiadvanyai (Budapest) (Natl. Meteorol. Inst. Offic. Publ.), vol. 32, 168p., 1967. 83 refs. Translated from Hungarian. Franklin Inst. Research Labs. Philadelphia, Pa., Science Info. Services, 207p., Sept. 1969.

A mathematical model is developed to incorporate the meteorological factors influencing the dilution of atmospheric pollutants from a point source, with a view towards optimizing the location of such installations as electric power plants. The model takes into account wind direction, wind speed, vertical wind profile, and thermal stratification by use of the equation of turbulent diffusion, with results calculated in average number of hours per year during which a concentration of pollution exceeds a given level. The computations are made by computer, and solutions based on new industrial and meteorological data can therefore be obtained rapidly. The method is applicable to sites at which ground level and upper-air wind observations have been made for at least a year or which are located no more than 150 km from an existing meteorological observatory in a broad lowland-type area. The turbulent diffusion equations are also programmed for determining the necessary stack height and emission velocity of the combustion gases of a power plant to achieve permissable emission levels in the region surrounding the power plant. The principal subject headings dealt with are meteorological, topographic, and industrial factors in air pollution; quantitative analysis of meteorological data; early investigations of turbulence and diffusion by Turner; and theory and application of the turbulent diffusion method. Two-hour values of the stability parameter for Budapest and 12 other cities for 1959-1963 have been calculated and are presented in a form ready for computerization; the values were interpolated from four daily radio sonde ascents on the basis of observed values of cloud cover, temperature, and the hourly wind values with reference to the isopletes of the average temperature gradients of the lower 300 m of the atmosphere.

16680

Berlyand, M. Ye., Ye L. Genikhovich, V. K. Dem'yanovich, and R. I. Onikul

INFLUENCE OF VERTICAL DISTRIBUTION OF TEMPERATURE AND SPEED ON WIND ON ATMOSPHERIC DIFFUSION OF RADIOACTIVE IMPURITIES. In: Radioaktivnyye izotopy v atmosfere i ikh ispol'zovaniye v meteorologii. Nauchnaya Konferentsiya po Yadernoy Meteorologii, Obninsk, 1964. Translated from Russian. Foreign Technology Div., Wright-Patterson AFB, Ohio, Translation Div. FTD-Mt-24-368-67, p. 10-19. 9 refs. CFSTI, DDC: AD 682 226

Previous Soviet research on problems of atmospheric pollution from continuously active point sources was based on models of conditions for wind velocity and the coefficient of turbulent exchange prevailing in the surface boundary layer of the atmosphere. The present paper discusses the inapplicability of this model to many existing and planned point sources and to problems of radioactive fallout. It presents a quantitative analysis of the effects of lapse rates, wind velocity, turbulent exchange, and other factors of atmospheric diffusion. Included is a mathematical model which reflects these factors as they actually occur in the thick boundary layer.

16687

Onikul, R. I., G. A. Panfilov, B. V. Rikhter, and R. S. Gil'denskiol'd

RESULTS OF ANALYSIS OF EXPERIMENTAL DATA CHARACTERIZING THE DISTRIBUTION OF ATMOSPHERIC POLLUTIONS NEAR THE THERMAL ELECTRIC POWER STATIONS. (Rezul'taty analiza eksperimental'nykh dannykh, kharakterizuyushchikh raspredeleniye atmosfernykh zagryazneniy vblizi teplovykh elektrostantsiy). Tr. Gl. Geofiz. Observ. (Moscow), no. 172:23-34, 1965. 13 refs. Translated from Russian. Foreign Technology Div., Wright-Patterson AFB, Ohio, Translation Div. FTD-MT-24-186-67

Meteorological and aerological data were collected on the diffusion of sulfurous gas and ashes from stacks of thermal electric power stations from 1961 to 1963. A method for analyzing the experimental data on surface concentrations at various distances from the plants was described in detail and contrasted with conventional methods of finding average sulfur dioxide concentrations. The method permits the determination of maximum SO2 concentrations and calculations of dangerous wind speeds. The results obtained by the method were in good agreement with theoretical calculations. Maximum SO2 concentrations at all sampling points were related to the wind speed, which depended on the initial flue gas exit speed from stacks and the degree of their overheating. At low speeds, flue gases rise to a great height. At higher speeds, the effective height is small, but the gases are dispersed over a greater distance. Rapid increases in surface concentrations follow initial increases in wind speed, but only very small changes in surface concentrations occur thereafter.

17401

Ministry of International Trade and Industry, Japan, Public Nuisance Section

DEVELOPMENT OF NEW SIMULATION SYSTEM FOR AIR POLLUTION FORECASTING. (Taikiosen yosoku no okeru atarashii shisutemu no kaihatsu ni tsuite). Text in Japanese. Kogai to Taisaku (J. Pollution Control), 6(1):19-23, Jan. 15, 1970.

A new system for forecasting air pollution is planned by the Ministry of Industry and International Trade. Its development involves the systematization of the over-all air pollution administration by conducting experimental field research, largely dependent on a wind tunnel test, and the analysis of the obtained empirical research findings by a simulation method. The data will be stored in a data-bank to be available for computer analysis whenever new factories or land reformation projects are planned in a concerned area. The air pollution simulation system will correlate all possible data on air pollution existing in the areas of coastal plants with geographical features, weather conditions, existing atmospheric inversion layers, smoke dispersion factors, regional capability for plant construction, layout of equipment, qualitative and quantitative investigations of fuel consumed, numbers of chimneys and their height, amount of smoke discharged, variation of temperature and wind speed, sulfur dioxide density, and so forth. All these variable will be used as computer input. The experimental findings obtained from the wind tunnel test are to be applied to the simulation system, which is expected to cover the factors associated with complicated geographical influences or atmospheric inversions relatively indigeneous to coastal regions in Japan. Two methods of simulation are considered applicable; simulation of the spot data on weather analysis, statistical treatment of collected records on air pollution, characteristics of smoke dispersion, and correlation air pollution patterns; and simulation by a wind tunnel test, the latter considered more practical under present circumstantial provisions. The mathematical model for the air pollution simulation system is discussed.

17612

Berlyand, M. Ye. and R. I. Onikul

PHYSICAL BASES FOR CALCULATING THE SCATTERING OF INDUSTRIAL EMISSIONS IN THE ATMOSPHERE. (Fizicheskiye osnovy rascheta rasseivaniya v atmosfere promyshlennykh vybrosov). Text in Russian. Tr. Gl. Geofiz. Observ. (Leningrad), no. 234:3-27, 1968. 53 refs.

Theoretical work related to atmospheric dispersion of impurities from industrial sources is reviewed. Practical recommendations are set forth with regard to the design of industrial enterprises so as to comply with standards for maximum allowable concentrations and establish so-called sanitary protection zones. Verification of these methods at several regional electric power stations at Minsk, Tallin, Bobruysk, Alma-Atinsk, Karagandinsk, and Daugavpilask and the Chelyabinsk Metallurgical Plant is reported.

17678

Bezuglaya, E. Yu.

DETERMINATION OF AIR POLLUTION POTENTIAL. (K opredeleniyu potentsiala zagryazneniya vosdukha). Text in Russian. Tr. Gl. Geofiz. Observ. (Leningrad), no.234:69-79, 1968. 19 refs.

Work in the U. S. on air pollution potential forecasting and Soviet efforts along these same lines are reviewed. For forecast purposes, the territory of the USSR is divided into four regions: l) a major portion of Eastern Siberia, where atmospheric stagnation is observed up to 25 days of the winter months; 2) the western European sector and northern foothills of the Urals, where moderate repeatability of atmospheric stagnation is observed; 3) the northeastern European sector and forest region of Western Siberia, where atmospheric stagnation is observed only in spring and winter; and 4) an area comprising Kazakhstan, Povolzh'ya, the northern section of Middle Asia, a large part of Western Siberia, and the shores of marginal seas where stagnation almost never occurs (l-2 times in 5 years).

17713

Gorlin, S. M. and I. M. Zrazhevskiy

WIND-TUNNEL STUDIES OF AIRFLOW OVER RELIEF AND URBAN-STRUCTURE MODELS. (Izucheniye obtekaniya modeley rel'efa i gorodskoy zastroyki v aerodinamicheskoy trube). Text in Russian. Tr. Gl. Geofiz. Observ. (Leningrad), no.234:45-59, 1968. 19 refs.

Wind-tunnel studies of airflow over a model of an isolated hill and over complex models simulating city structures are described. The overall flow picture was not significantly altered by Reynolds numbers in the range (5.1-31.5) times 10 to the 5th power. Increasing the turbulence of the incident flow resulted in a more uniform velocity distribution along the normal to the obstacle. Changes in incident flow turbulence had a greater effect on the flow field around complex obstacles. This experimental technique is deemed valuable for solving actual meteorological problems.

17719

Chiaki, Toshio

METEOROLOGICAL CONDITIONS AND SMOKE DIFFUSION. 44. ANALYSIS OF TURBULENT BOUNDARY LAYER (II). Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 2(1):70-77, 1967. Translated from Japanese. 2p.

In the turbulent boundary layer, the vertical distribution of the wind speed is represented by the logarithmic and linear type law. The thickness of the boundary layer is 30 m to approximately 300 m, and is connected with the atmospheric stability. It is thickest in the neutral atmosphere and thin in the stable and unstable atmosphere. The turbulance intensity of the atmosphere in the boundary layer becomes larger as the layer approaches the ground. The vertical distribution roughly comforms to the logarithmic law. The value of the turbulence intensity is affected by the atmospheric stability. The ratio of the turbulence intensity for 1 minute to the average wind speed exceeded 0.10 in the unstable atmosphere. The atmospheric diffusion coefficient, obtained from this ratio, showed a tendency to be proportional to the square of the surface wind speed.

17722

Inoue, Rikita, Satoshi Nakajima, and Yasushi Ogawa

METEOROLOGICAL CONDITIONS AND SMOKE DIFFUSION. 47. ANALYSIS OF THE DOWN-DRAFT BY MEANS OF WIND-TUNNEL EXPERIMENTS. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 2(1):70-77, 1967. Translated from Japanese. 3p.

Turbulence intensity in the case of average wind speeds of 0.5, 1.0, 1.5, and 2.0 m/s at several places leeward of the turbulence lattice was measured. A miniature-type low velocity diffusion wind-tunnel was used. The results were analyzed with respect to mode of decay of the turbulence intensity, self- correlation coefficient, and spectrum distribution. The mechanism of the down-draft in a simple building model was also investigated on the basis of these data. The chief items that were analyzed included the distribution of the average wind speed on the lee of a building and photographic analysis of the types of smoke.

18204

Smoktiy, O. I.

LIGHT SCATTERING IN A SPHERICAL ATMOSPHERE CONTAINING AEROSOLS. Atmos. Oceanic Phys. (English translation), 5(1):23-31, Jan. 1969. 10 refs. Translated from Russian by P. A. Keehn.

The basic boundary value problem for finding the mean intensity of multiply scattered light in a spherical aerosol atmosphere is formulated. The numerical data obtained on the brightness of the crepuscular aerosol atmosphere are analyzed for a case when the orbit of a space vehicle is high enough, and the observer is in the shadow zone at a great distance from the terminator line. Results showed that for aerosol atmosphere models, the scattering indicatrices, theoretically computed and determined on the basis of experimental data, lead to almost identical results at heights exceeding 10 to 12 km. A pronounced difference in brightness was observed only in the lower 6 km layer of the atmosphere. Calculations of the results for absorption of solar radiation by atmospheric ozone showed a decrease in the brightness of the crepuscular aureole, and ozone exerts a substantial effect on the evolution of color of the crepuscular sky at a height of 25 to 45 km. (Author abstract modified)

19274

Tavartkiladze, K. A.

INCREASE IN ATMOSPHERIC DUSTINESS OVER THE USSR. (Uvelicheniye zapylennosti nad territoriey SSSR). Text in Russian. Meteorol. i. Gidrol., no. 5:42-52, 1970. 20 refs.

The problem of changing atmospheric concentration of aerosol particles at a number of points in the USSR (Karadag, Tbilisi, Yerevan, Baku, Tashkent, Alma-Ata, Irkutsk, and Yakutsk) during recent decades is examined. Available data for integral solar radiation and other characteristics of the atmosphere are used to eliminate errors which frequently arise from use of the Bouguer-Beer formula. A general trend toward increasing atmospheric dust content over the entire Soviet Union is established.

19618

Pivovarova, Z. I.

DISTRIBUTION OF TRANSPARENCY COEFFICIENT OF THE ATMOSPHERE (FOR INTEGRAL FLUX) THROUGHOUT THE TERRITORY OF THE USSR. (Raspredeleniye koeffitsienta prozrachnosti atmosphery (dlya integral'nogo potoka) po territorii SSSR). Text in Russian. Tr. Gl. Geofiz. Observ. (Moscow), no. 213:105-121, 1968. 13 refs.

Surveys of atmospheric transparency coefficients throughout the Soviet Union for the months of January, March, June, and September are reported. A map showing the attenuation of solar radiation due to aerosols, together with atmospheric turbidity, is also presented for the month of June. The transparency of the atmosphere varies considerably with longitude at constant latitude, with variation in total direct solar radiation reaching 7 kcal/sq cm at 60 degrees north, and 15-20 kcal/sq cal at 45 degrees north. Distribution of transparency coefficients was found to be affected primarily by water vapor content and also to a great extent by persistent aerosols.

19740

Imyanitov, I. M. and Ye. V. Chubarina

RELATIONSHIP BETWEEN THE ELECTRICAL FIELD OF THE ATMOSPHERE AND NUCLEI OF CONDENSATION. In: Electricity of the Free Atmosphere (Results of Measurements During the IGY and MGC). (Elektrichestvo svobodnoy atmosfery (rezul'taty uzmereniy vo vremya MGG i MGC). Lenigrad, Gidrometeorologicheskoye Izdatlel'stvo 1965, Chapt 6, p. 74-82, 177-178, 180-182. 9 refs. Translated from Russian. Foreign Technology Div., Wright-Patterson AFB, Ohio, Translation Div., 9p., Aug. 21, 1968. CFSTI, DDC: AD 685507

Data on electric field strength of the atmosphere and the concentration of condensation nuclei that were obtained in 25 aircraft soundings were mathematically analyzed to determine the relationship between electric field strength and nuclei concentration up to 2.5 km. The presence of a close relationship was established. In those cases where exponential decreases of field strength and concentration of nuclei were observed, coefficients in the exponents of corresponding formulas are close to one another in value. The connection between field strength and concentration of nuclei is due to changes in the conductivity of air. This makes it possible to estimate average dimensions of nuclei. Height distribution curves of electric field strength and the concentration of condensation nuclei were also plotted according to data obtained from 27 flights made in midsummer. The curves are very similar to one another; both electrical field strength and condensation nuclei show maximums at 500-700 m. The maximum vertical distribution of both nuclei and electric strength are greatly influenced by inversions and the intercepting layers connected with them.

19758

Kabanov, M. V., et al

POLARIZATION OF LASER EMISSION SCATTERED BY FOG AND SMOKE. Fiz. Atems. i Okeana (Moscow), 4(10):1116-1119, 1968. 10 refs. Translated from Russian. Techtran Corp., 7p., Oct. 14, 1969. CFSTI, DDC: AD 695958

The results of experimental investigations of the degree of polarization of scattered forward and reflected light are discussed, including laser-emission in artifical fog and smoke. Measurements were conducted in a 35 cu m artifical fog chamber; a flow of linearly polarized emission from a gas laser on He-Ne mixtures, wavelength 0.63 mkm, was directed into the chamber with a given scattering medium. A method of measurement was used that significantly decreased errors from the temporary instability of the substances under investigation. During dispersion of narrow laser beams, the theory of momentary scattering describes not only the dependence of scattered light intensity on optical thickness, but also the polarizing ability of scattered forward light.

19767

Mashkova, G. B.

WIND PROFILES WHEN CLOUDS ARE LOWER THAN 300 M. Tr. Inst. Prikl. Geofiz. (Leningrad), no. 10:3-17, 39-43, 1967. 3 refs. Translated from Russian by L. Heenan, Foreign Technology Div., Wright-Patterson AFB, Ohio, Translation Div., p. 23-29, Jan. 30, 1970.

Systematic wind measurements made in 1964 on a 300-m tower at Obninsk were used in compiling wind profiles during periods when the area was covered by low clouds. Observations lasting two days were made once every two weeks of air temperatures and wind speeds and directions. There were 90 instances during which the ceiling was below 300 m. Wind profiles drawn for these instances fell into three categories: type 1 is characterized by a smooth increase in wind speed with height; type 2 by the existence of a maximum speed at some elevation; and the third type, by a complicated, frequently S-shaped profile. These main types of profiles are further subdivided. Type 1a has stable stratification with small lapse rates both under and within the cloud deck and has large wind speed gradients. Types 1b and 1c have larger lapse rates and lower wind speed gradients than in type 1a. On profiles of the 2a and c types, the lapse rate is of the order of 0.5 deg per 100 m under the cloud deck, 0.6-0.7 deg per 100 m at the cloud base and 0.4-0.5 deg per 100 m in the clouds. On type 2b profiles in the lapse rate is 0.96 deg per 100 m under the ceiling, decreasing to 0.5 deg per 100 m at the cloud base and in the clouds. The vertical gradient of the wind speed changes sign at the edge of the cloud base (2a), is somewhat below it (2b) and above it (2c). Type 3 profiles are characterized by sub-cloud lapse rates. (Author abstract)

19781

Petrova, G. M. and A. N. Miroshkina

MECHANISMS OF AEROSOL PARTICLE DISPERSION IN THE FREE ATMOSPHERE. 1969 (?). 13 refs. Translated from Russian. Techtran Corp., 42p., Sept. 25, 1969. CFSTI, DDC: AD 695511

The dispersion in the free atmosphere of irregular-shaped particles 100-1000 micron in diameter from altitudes of 500-8000 meters and of spherical particles 30-100 micron in diameter from altitudes of 500-1000 meters was investigated. Luminescent sand and plastic particles were employed as indicators. The determining factor in the dispersion of large particles was gravitational settling. As particle size diminished during dispersion, gravitational settling assumed less significance and the influence of atmospheric turbulence increased. In the case of the smallest particles, the effect of atmospheric turbulence completely dominated gravitational settling. The intensity of the turbulence is determined by the wind field and the degree of thermal stability of the atmosphere. Strong winds and unstable stratification contribute to an increase in turbulent dispersion. Empirical formulas are given which permit computation of the surface concentration of particles which have fallen from an instantaneous point source in a specific distribution according to descent velocity. An analysis of the dispersion factors in impurities of the coefficients of transverse and vertical diffusion is given. (Author abstract modified)

19828

Yanagihara, Shigeru

PHOTOCHEMICAL REACTIONS OF AUTO EXHAUST. (Jidosha haikigasu no kokagaku hanno). Text in Japanese. Kuki Seijo (Clean Air - J. Japan Air Cleaning Assoc., Tokyo), 8(2):10-17, June 1970. 5 refs.

Control is quite difficult of the automotive emissions of nitrogen oxides and hydrocarbons which contribute to the production of photochemical smog, resulting in eye irritation and plant damage. In connection with this problem, a brief description of the effect of solar radiation in terms of wave length, energy, and irradiation angle on the absorption mechanisms of various substances is presented tabularly and graphically. Possible chemical reactions due to the radiation energy of fluorescent light as well as solor radiation are described in terms of reaction formulae. A smog chamber was used to investigate the photochemical effect, while radiation source was a set of three hundred 100 W fluorescent lamps with the intensity of 1000 micro-W per sq cm (3450-3550 A). The chamber which was about 11 cu m, contained various measurement devices, radiation and dilution sources, as well as a chassis dynamometer to simulate different driving and idling conditions in order to produce exhaust gases. The general schematic diagram is given. Data are plotted for the irradiation of nitric oxide plus ethylene, showing that the smaller the initial concentration of NO, the larger the rate of increase of NO2 and the faster the formation of oxidants. The faster the reaction, the higher the HC/NO ratio will be. Data are presented for actual exhaust gases under simulation conditions, and also for the effects of different types of hydrocarbons. Definite relations were observed between the initial concentrations of NO and HC and the resulting concentration of oxidants. Reported connections with many types of HC, such as paraffin, olefins, and alkyl benzene, and the degree of irritation of the eyes are quantified in terms of a mathematical formula. A list of reactivit of organic materials is included, according to ozone or oxidants, peroxides, formaldehydes, aerosols, eye irritation, plant damage, and average reactivity index.

20155

Zilitinkevich, S. S., D. L. Laykhtman, and A. S. Monin

DYNAMICS OF THE BOUNDARY LAYER OF THE ATMOSPHERE. Izv. Akad. Nauk SSSR, Fiz. Atmosfery i Okeana, 3(3):297-333, 1967. 142 refs. Translated from Russian. 66p.

Modern developments in research on a planetary boundary layer are reviewed and fundamental theoretical models analyzed. The similarity theory of the boundary layer is discussed. Experimental results concerning vertical profiles of wind components, temperature, turbulent exchange coefficients, dissipation rate of turbulent energy, and other parameters are summarized. A priori models of the coefficients of viscosity are developed. (Author abstract modified)

20351

Takamatsu, T., M. Naito, Y. Ikeda, and K. Kawata

CALCULATION OF PREDICTION FOR POLLUTANT CONCENTRATION. (Taiki osen nodo yosoku keisan moderu no kosatsu). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 4(1):15, 1969. (Proceedings of the 10th Annual Meeting of the Japan Society of Air Pollution, 1969.)

By electronic computer analysis of data on pollutant concentrations and meteorological conditions obtained by telemetry, a differential equation and its various solutions was developed in order to calculate and predict the pollution concentration by time and location. The first-order differential equation is essentially an adjustment type equation where the time rate of change of concentration is specified within an atmospheric volume (zone) V. The equation depends on the parameter of vertical mixing, the concentration in question, the concentration of pollutants from the region outside V, the strength of emission in the zone, the station number, and the rate of diffusion of pollutants. Some of the parameters are determined from meteorological data, and the others implicitly from a combination of data. Based on the actual density of pollution (sulfur component) at 20 and 110 meter altitudes on Osaka Tower, it was suspected that in the immediate neighborhood of the tower, the ground level pollution is always concentrated in winter and that the effect of the localized surface emission sources is large. The result of the calculation tended to confirm the suspicion.

20629

Takamatsu, T., M. Naito, Y. Ikeda, and K. Kawada

CONTROL FOR AIR POLLUTION. (Taiki osen seigyo ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 4(1):16, 1969. 2 refs. (Proceedings of the 10th Annual Meeting of the Japan Society of Air Pollution, 1969.)

By using a mathematical model that describes the atmospheric pollution concentration in a metropolitan area, the concentration a few hours away can be predicted when there is a continuous influx of data from the monitoring stations; control methods for pollution phenomena that contain too many uncertain elements can be probabilistically determined. The mathematical model is essentially a first-order differential equation that is described by vector and matrix notations, since the metropolitan area can be divided into N zones over a discrete time period k. By employing stochastic methods and optimality calculations, the desired results, the expected value of the concentration S hours away and the optimal control variable at zone i and time k, can be determined.

21122

Reidat, Rudolf

FINDINGS ON THE VARIATION OF UNSTABLE WEATHER CONDITIONS IN THE LOWER PORTION OF THE ATMOSPHERE FROM TEMPERATURE RECORDINGS UP TO A HEIGHT OF 200 METERS AND THEIR APPLICATION IN SUPERVISING THE HAMBURG INDUSTRY. (Erkenntnisse ueber den gang der Instabilitaet der unteren Atmosphaere aus temperatureregisterierungen bisweihundert Mete Hoehe and inhre Anwendung bei der Beratung der Hamberg Indstrie. Inst. Gewerbliche Wasserwirtschaft Luftrein Halting Forum, vol. 6:41-58, 1967. 2 refs. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 20p., Sept. 22, 1969.

The frequency and duration of stable air masses up to 500 m was determined from data obtained during weather observation flights between 1933 and 1944 before the construction of a large power plant near Stade. To determine how stack height would affect mixing in the immediate vicinity of the plant, temperature lapse rates were monitored up to 200 m. On a yearly average, 167 days with surface inversions were counted, one fourth of which reached a height of 200 m and one fourth, a height of more than 350 m. Seven eighths of these temperature inversions disappeared by afternoon. The days on which no mixing occurred averaged about 44 a year. Only one fourth of the stable weather conditions lasted longer than four days. The longest stable conditions prevailed in December. Analysis of the temperature lapse rates showed that half of the hours between midnight and sunrise are marked by temperature inversions which extend to 175 m. No inversions were recorded between noon and 2 P.M. It is concluded that high stacks reaching higher than surface haze emit smoke in a coning plume until midnight, after which stabilizing upper layers change the smoke plume to a fanning one. A special weather service is suggested to guard against emissions during stable conditions.

21646

Budyko, M. I.

RADIATION FACTORS OF CONTEMPORARY CLIMATE CHANGES. Radiotsionnye faktory sovremennykh izmenenii klimata). Izv. Akad. Nauk SSSR, Ser. Geogr., no. 5:36-42, 1968. 7 refs. Translated from Russian. Belov and Associates, Denver, Colo., 12p., April 18, 1970.

Data are presented on the variations of air temperature for zones from 17 to 19 deg north lat and of solar radiation reaching the earth, over approximately the last 100 years, from 1880-1885. A rise in temperatures which began at the end of the 19th century halted about 1940 and changed to a decrease, with larger changes in the middle and especially the high latitudes. The radiation curve shows two maxima, one at the end of the last century and a second, more prolonged peak during the 30's; a decrease began in the 1940's. These variations are related to changes in atmospheric transparency, as when sharp decreases in solar radiation occur after explosive volcanic eruptions fill the lower layers of the atmosphere with volcanic dust; average earth temperatures may decrease several tenths of a degree. With settling of the dust, radiation and temperatures increase. The radiation decrease beginning in the 1940's may be due in part to similar effects on atmospheric transparency from industrial pollution and nuclear weapons testing. If the present large quantities of atmospheric dust are of volcanic origin, temperatures may be expected to rise if no new major eruptions occur; if a significant portion is from human economic activity, the decrease in temperatures may be of long duration. The need for worldwide data on volcanic eruptions, dust, atmospheric regimes and solar radiation is stressed.

22080

Minowa, Toshio

STRUCTURE OF GROUND INVERSION IN YOKOHAMA. Kenkyu Jiho (J. Meteorol. Res.), 21(1):23-36, Jan. 1969. 8 refs. Translated from Japanese. Franklin Inst. Research Labs., Philadelphia., Pa., Science Info. Services, 30p., Dec. 3, 1969.

The results of over 300 meteorological soundings of nocturnal ground inversion layers in urban areas are analyzed. The soundings were conducted by the use of kite-balloons and ad-balloons in cold weather. In the outer urban area, most of the temperature inversion appeared directly upwards from the ground surface. Isothermal layers were observed up to 150 ft from the ground with the inversion elevated about this layer only on windy nights. This is due to the turbulent mixing flow, mechanically produced by windward hills or roughness in the surface layer. In the central area of the city is a heat-island, due to the artificial heat supply. The temperature profile here is characterized regardless of wind by the elevated inversion layer, with a base height which reaches higher than 200 ft. (Author abstract modified)

22228

Parvis, Daniele

CONDENSATION NUCLEI IN THE AIR OF ARTIFICIALLY HEATED ENVIRONMENTS. (I nuclei di condensazione nell'aria degli ambient artificialmente riscaldati). Ann. Sanita Publica (Rome), vol. 13:1569-1581, Nov.-Dec. 1952. 20 refs. Translated from Italian. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 20p., Dec. 16, 1969.

An investigation was conducted to establish numerical values of condensation nuclei in the air of artificially heated environments. The number of condensation nuclei was determined with an Aitken counter, and an Owens jet dust counter was used to determine the particle content of the air. Basic climatic factors including temperature, humidity, air movement, and atmospheric pressure were measured. The outdoor air in the center of Milan between 11 am and 1 pm from January to March 1952 contained an average of 100,000 condensation nuclei/cc. Inside the rooms investigated, the number of nuclei was approximately 50% lower and fluctuated between 32,000 and 74,000/cc. The lowest levels of condensation nuclei were found in air-conditioned and electrically heated rooms and highest levels prevailed in environments heated by coal stoves associated with dryness and irritation of the mucous membrane of the upper airways. It is believed that data on nucleation represent useful parameters of air hygiene in different environments. Further studies on ionization and nucleation are required to define the climatic factor which influence well-being in confined rooms.

22315

Nomoto, S., Y. Takigawa, K. Enoshima, and M. Anzai

A STATISTICAL STUDY ON THE VISIBILITY FORECASTING (PART 2)- PREPARATION AND VERIFICATION OF THE MULTIPLE REGRESSION EQUATION FOR VISIBILITY FORECASTING. Kishacho Kenkyu Jiho (J. Meteorol. Res. (Tokyo)), 21(1):9-17, Jan. 1969. 4 refs. Translated from Japanese. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services. 22p., Dec. 3, 1969.

Multiple regression equations for visibility forecasting were constructed by using the HITAC 5020 computor. In these equations, predictands are the averaged visibilities in the afternoon and the minimum visibilities after sunset, and predictors are 35 meteorological elements observed in the morning. Verification confirms that the forecasted visibilities by the multiple regression equations are close to the observed ones; for instance, a correlation coefficient is 0.637. The relation of multiple correlation coefficients to the number of predictors through six multiple regression equations indicates that accuracy of the method increases up to 3 or 5, then increases slowly with the number of predictors employed. A regression equation was prepared for each N (N equals 1.2......20) of selected predictors out of 35 predictors, then each accuracy of the the methods by 5, 10 and 20 predictors was verified; the most accurate method is the one by 10 predictors, then the 5 and 20 predictors follow. (Author abstract modified)

22403

Nomoto, S. and K. Enoshima

A STATISITICAL STUDY ON VISIBILITY FORECASTING (PART I). Kenkyu Jiho (J. Meteorol. Res.), 20(12):1-16, Dec. 1963. 7 refs. Translated from Japanese. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 50p., Dec. 19, 1969.

A method for objective forecasting of visibility by means of statistics and correlative analysis is described. Visibility predictors and correlative coefficients are calculated for minimum visibility in the evening and averaged for days with or without rainfall. Useful predictors with high correlation coefficients, such as meso-scale pressure pattern, atmospheric stability, and wind velocity in the lower atmosphere are selected. By combining these, some forecasting diagrams are constructed. The forecasting method by these diagrams is verified as useful; minimum visibility in the morning and evening can, in general, be predicted within an error of 1.5 miles. The method considers industrial pollution in the form of volume and variation of aerosols. Other parameters considered include cloud cover, dust-fall, precipitation, temperature, pressure, humidity, winds, and inversions. (Author abstract modified)

22417

Szepesi, Dezso

AIR POLLUTION'S RELATIONS TO METEOROLOGY. (A levegoszennyezode's meteorologiai vonatkozasai). Text in Hungarian. Energia Atomtech. (Budapest), 23(5):215-222, 1970. 9 refs.

Meteorological quantities of air pollution implicate altitude wind, stability parameter, thickness of the mixing layer, and the number of 'Degree-days of heating' (C room-temperature multiplied by days/year of heating). These quantities are available for the City of Budapest and used in the paper as examples. The above four quantities, the 'background load' of pollutants and the emission charateristics of significant point-sources of pollutants will define the actual pollution load at a particular location, as a function of time. There are a few physical characteristics of the load calculation that had not been adequately defined, especially the roughness parameter of the terrain. This latter depends on the vertical profile of the area and the degree of coverage by buildings. Investigations are underway (both in Hungary and abroad) to obtain mathematical expressions for the roughness parameter. When the investigations are completed, air pollution forecasting for cities will be possible, and even smog formation will be predictable from meteorological data.

22921

Rozenberg, G. V.

POSSIBILITIES FOR DETERMINING EXPERIMENTALLY THE SPECTRA OF TRUE ABSORPTION FOR CLOUDS AND FOGS. IN: Investigation of Clouds, Precipitation, and Thunderstorm Electricity. (Issledovaniya oblakov, osadkov i grozovogo elektrichestva). Moscow, Izd-vo Akademia Nauk SSSR, 1961. p. 58-64. 22 refs. (Presented at the International Symposium on Radiation, Oxford, July 1959.) Translated from Russian by D. Grandjean, Foreign Technology Div., Wright-Patterson AFB, Ohio, Translation Div., 11p., Feb. 23, 1968. CFSTI, DDC: AD 682774

Radiational processes in clouds and fogs are considered in the study of the volumetric factors of absorption and dispersion and their spectral relationships. Everything discussed relates to that region of the spectrum where self-radiation of the dispersive substance or gaseous phase does not play a part. Reliable methods of experimentally determining the true spectra of absorption and dispersion in clouds and fogs are possible; they are by no means trivial, and their development requires special attention.

23039

Gandin L. S. and R. E. Soloveichik

ON THE PROPAGATION OF SMOKE FROM FACTORY STACKS. (O rasprostranenii dyma iz fabrichnykh trub). Tr. Gl. Geofiz. Observ. (Leningrad), no. 77:84-94, 1958. 14 refs. Translated from Russian by Irene A. Donehoo, Weather Bureau, Washington, D. C. Foreign Area Section, 15p., Jan. 1961.

A theoretical analysis of smoke propagation from factory stacks is performed to establish the relationships among the strength of the source (amount of smoke per unit time), rate of fall of particles, concentration of admixture, and wind speed. Both the wind speed and the horizontal exchange coefficient are considered to increase with height in an approximation of true atmospheric conditions. The effect of superheating of the effluent particles is insignificant within the framework of the analysis and is disregarded. Maximum concentration was independent of either wind speed or the horizontal diffusion coefficient; rather, it is wholely a function of time. In the discussion of the effects of the particle, the aerosol is assumed to be polydisperse, but the size of each particle is assumed to be constant. An increase in the source strength increases the concentration only to a limit, following which additional increases result in a decrease in concentration.

23304

Selezneva, E. S.

INVESTIGATIONS OF CONDENSATION NUCLEI AND THE CHEMICAL COMPOSITION OF ATMOSPHERIC PRECIPITATION. Tr. Gl. Geofiz. Observ. (Leningrad no. 218:266-276, 1967. 16 refs. Translated from Russian. Israel Program for Scientific Translations, Jerusalem, 11p., 1970. CFSTI: TT-68-50493

A brief history of the investigation of atmospheric condensation nuclei is presented, and recommendations are made as to the direction of future studies in this area. The material covered is principally Russian in origin with some reference to non- Russian work. Maps are included to show the distribution of condensation nuclei over Russia and their sources are identified. Comment is made on the role of precipitation in stripping the lower atmosphere of soluble suspended particulates.

25811

Lebedinskiy, A. B.

CONCERNING INDIRECT DETERMINATION OF THE REPEATABILITY OF LARGE-SCALE NEAR-GROUND INVERSIONS IN CITIES OF SIBERIA. (K voprosu o kosvennom podschete povteryaemosti moshchnykh prizemnykh inversiy v gorodakh Siberi). Text in Russian. Tr. Nauchn. Issled. Inst. Aeroklimatologii, 54(4):55-60, 1968. 11 refs.

Data on the repeatability of near-ground and 'hazardous' inversions as determined for a number of Siberian cities (Barnaul, Krasnoyarsk, Novosibirsk, Kolpashevo, Nizhneudinsk, Zhigalovo, Kurensk, and Erbogachen) are presented, together with the computational basis used for making these determinations. It is possible to make sufficiently accurate determinations of average and maximum repeatability of 'hazardous' inversions for locations with similar physicogeographic conditions using wind-vane data alone.

26845

Fukoka, Saburo

ON THE RELATIONS BETWEEN WEATHER MAPS AND HIGH LEVEL SO2 CONCENTRATION IN TOKYO. (Kiatsu haichi patan to Tokyo-to ni oker SO2 konodo osenbi no shutsugen keiko ni tsuite). Text in Japanese. Tokyo-to Kogai Kenkyusho-ho, (Ann. Rept. Tokyo Metropol. Res. Inst. Environ. Protection), Sect. 1:51-64, Jan. 1970. 1 ref.

The relationship between the atmospheric pressure arrangements and high pollution concentrations was investigated by means of a computer, based on the classification of pressure patterns in and around Japan and the pollution conditions corresponding to each pattern. Detailed data are listed for the frequency of occurrence of high concentrations of sulfur dioxide pollution (over 0.1 ppm/ day) for different atmospheric pressure patterns in each of the fou seasons. The data range from 1964 to 1967. The pressure patterns that bring high concentrations of sulfur dioxide to Tokyo are South High type and mobile anticyclones, and the former especially cause high concentrations during winter with high probability. The effec of the cyclone and the front on sulfur dioxide concentration is not as clear-cut. Forecasting based on the pressure patterns of high sulfur dioxide concentrations seem to be still quite difficult in view of the result of the investigation. Further classifications of patterns and inclusion of more data in the future are necessary.

26851

Nakano, Michio and Jiro Narikawa

FORECASTING HIGH-CONCENTRATION AIR POLLUTION. (Konodo taiki osen no yoho). Text in Japanese. Sangyo Kogai (Ind. Public Nuisance), 6(4):237-248, April 1970.

It is important to accomplish active early control of pollution sources dependant on the meteorological condition rather than to control the pollution source after a smog alert has been issued and the concentration is already high. From such a viewpoint, the possibility of early air pollution forecasting was investigated by creating a forecasting check sheet based on the basic framework of atmospheric pressure distribution over Japan and the central areas and the upper layer winds as well as temperature measurements on top of Mt. Ikoma. The items discussed are the air pollution in Osaka, the relationship between pressure distribution and high concentration days in Osaka, the relationship between upper winds, atmospheric stability and pollution concentration, the various ways in which pollution can be forecast in Osaka, and the accuracy of prediction.

26863

Beilke, S.

RESEARCH CONCERNING THE WASHOUT IN PRECIPITATION OF ATMOSPHERIC ELEMENTS. Frankfurt Univ., West Germany, Inst. fur Meteorologie und Geophysik, Rept. 19, 77p., April 1970. 33 refs.

Laboratory experiments in a rain chamber of 1 cu m indicate that the washout speed for sulfur dioxide is higher than for nitrogen dioxide. The decrease of SO2 concentration by washout at a certain initial concentration can be described by a formula involving precipitation intensity, drop size distribution, pH value, and water temperature. The washout conditions for NO2 are more complicated, but the decreases of NO2 concentration by washout can be approximated by a formula. Washout speeds at constant precipitation intensity for both gases increase as drop size decreases. The washout speeds also increase with rising pH of the rain water. Experiments with Aitken cores result in considerably smaller washout speeds than for SO2 or NO2. This results because the particles are not of uniform size. An SO2 landing coefficient for raindrops can be determined which forms the foundation for the calculation of a sulfate quantity which a rain of given intensity and drop size distribution contains. The sulfate concentration in rain water decreases with rising rain intensity as a square function. The contribution of aerosols and ground concentrations of SO2 to concentrations of sulfate in rain water are discussed. (Author conclusions modified)

27745

Makhon'ko, K. P., A. S. Avramenko, and E. P. Makhon'ko

WASHOUT OF RADIOACTIVE ISOTOPES AND CHEMICAL COMPOUNDS FROM THE ATMOSPHERE. Academy of Sciences of the Lithuanian SSR, Inst. of Physics and Mathematics, Conf. Acad. Sci. Lithuanian SSR, Atmos. Scavenging Radioisotopes Proc. Sess. Inst. Phys. Math., Palanga (USSR), 1966. (June 7-9.) 28 refs. Translated from Russian. Israel Program for Scientific Translations, Jerusalem, p. 174-184, 1970. NTIS: TT 69-55099

An analysis is presented of published data collected in England fro 1957-1964 at relatively clean air sites on the concentration of nine individual radioactive isotopes of global origin and chemical compounds in precipitation water and in the air. Isotope washout is characterized by the ratio of their concentrations in precipitation and in air at the cloud-layer altitude. Relationship are found between the concentration of global-origin isotopes and chemical compounds in precipitation on the one hand and the precipitation total on the other. The slope of these curves yields the washout rate of the corresponding substances. Differences are noted in the washout rates of individual isotopes: zirconium (95) is the most rapidly scavenged from the atmosphere, strontium (90) is washed out better than cesium (137) and strontium (89), while the washout rate of antimony (125) and other isotopes is much less. Sulfates are washed out from the atmosphere somewhat less than chlorides and carbonates. The washout times of isotopes and sulfates from the atmosphere are approximately 24 hrs. Washout of industrial pollutants is better at their origin than far from it. An attempt is made to ascribe these relationships to features of aerosol particle transport and their future aging in the atmosphere These factors affect the particle sizes, which determine their rate of removal by precipitation. (Author abstract modified)

27823

Rastorguyeva, G. P.

CHARACTERISTICS OF THE THERMAL REGIME OF CITIES. In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature Effects of Meteorological Conditions and Relief on Air Pollution; Air Contaminants - Their Concentration, Transport, and Dispersal. M. Y. Nuttonson (ed.), Vol. 5, Silver Spring, Md., American Institute of Crop Ecology, 1970, p. 10-17. 17 refs. (Also: Tr. Gl. Geofiz. Observ. (Leningrad), no. 238:145-152, 1969.)

To study the combined influence of natural and urban landscape on the meteorological regime of the industrial city of Donetsk, USSR, surface humidity and air temperature measurements were taken at points representative of asphalt in the city proper and bare soil and grass in suburban areas. The peculiarity of this city is the fact that is is located on a dissected terrain where the heights are exceeded to a maximum of 100 m. The investigation showed that a heat island is formed in the afternoon hours and, as in other cities, manifests itself best during night hours in summer months. The increased influence of the city on the thermal region is the result of two factors promoting an increase in the air temperature of the city at night: an enhanced heat transfer in the central part of the city and a relative increase in the air temperature in this most elevated part of the city.

28323

Rat'kov V. M.

DAILY OZONE VARIATIONS. Bull. Acad. Sci. USSR, Phys. Atmos. Oceans (English translation from Russian of: Izv. Akad. Nauk SSSR, Fiz Atmosfery i Okeana), 6(3):156-159, March 1970. 22 refs.

A series of numerical experiments were performed to determine nocturnal and diurnal vertical ozone profiles in the mesosphere. The results suggest that classical photochemical theory cannot explain the nocturnal increase in total ozone layer thickness observed from the earth. According to the classical theory, recombination of 'unimpaired' atmospheric oxygen atoms at night may lead to the formation of additional ozone at certain altitudes. Errors are assumed to have been made in the numerical experiment.

28357

Byzova, N. L. and E. K. Garger

EXPERIMENTAL STUDY OF DIFFUSION PARAMETERS WITH THE AID OF SMOKE PLUMES. Bull. Acad. Sci. USSR, PHys. Atmos, Oceans (English translation from Russian of: Izv. Akad. Nauk SSSR, Fiz Atmosfery i Okeana), 6(10):593-599, Oct. 1970. 18 refs.

Measurement results of the relative and adveraged lateral variances of smoke plumes at 100 m level over the earth's surface are described. The validity of a Gaussian distribution of instantaneous axis ordinates is examined, as is a stationary case caused by mesoscale vorticity. The rate of dissipation of turbulent energy is evaluated by two independent methods. (Author abstract modified)

28609

Tamura, Kunio and Shinichi Nomoto

FORECASTING METHOD OF SO2 BY MULTIPLE REGRESSION EQUATIONS DEVELOPED BY SCREENING PROCEDURE. (Jukaikishiki (senbetsuho) ni yoru SO2 no yosoku). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 5(1):216, 1970. (Proceedings of the Japan Society of Air Pollution, Annual Meeting, 11th, 1970.)

Multivariate statistical analysis was performed on the relationship between meteorological data, such as atmospheric pressure patterns, wind speed, and atmospheric stability, and sulfur dioxide levels up to 10 hrs after the meteorological measurements. By feeding a forecasting equation to an electronic computer and giving it the meteorological data inputs, the concentration of SO2 several hours hence can be predicted. The forecasting equation was constructed by means of screening procedures, which assume that the factor to be predicted can be expressed as a linear polynominal equation of the meteorological factors, and that the coefficients for those factors can be calculated in order to maximize the multiple correlation coefficient. For the multiple regression equations, ten to 20 factors were optimal. Some of the factors taken into consideration were wind direction and speed, atmospheric pressure and temperature, dew point differential, stability, conversion, and relative vorticity. A total of 259 days were analyzed betweeen October 1965-March 1966 and October 1966- March 1967.

28616

Nogami, Junji, Tsuguo Mizoguchi, Hideyuki Nomoto, Yoshinori Ishikawa, and Akiko Miyao

AIR POLLUTION POTENTIAL FORECASTING. (Taiki osen potensharu yoho n tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 5(1):219, 1970. (Proceedings of the Japan Society of Air Pollution, Annual Meeting, 11th, 1970.)

When sulfur dioxide concentration continuity is made to correspond to air pollution potential, the positions of migratory anticyclones and extra-tropical cyclones that appear in western Japan between late autumn and winter are of interest. A method is described whereby air pollution potential can be determined, with the aid of computer, from the forecasting weather map published by the Meteorological Agency. Criteria for a day of high potential pollution are as follows: Osaka is within 6 mb from the center of the anticyclone; atmospheric air pressure differential is within 6 mb in the region 30-40 N, 130-140 E; a cold front is closing in fro the Sanin area; a stationary front exists north of 30 N; and Osaka is between two cyclones. Similar qualifications are given for days of low potential and intermediate potential. A test run based on sets of data obtained at 9 am of the day prior to the forecast showed that for most cases, the accuracy was over 80%.

29178

Shiozawa, Kiyoshige, Alsushi Ootaki, and Shinichi Okamoto

ON THE ANALYSIS OF AIR POLLUTANTS BY CANONICAL CORRELATION ANALYSIS-RELATION OF METEOROLOGICAL CONDITION. (Seijun sokan bunseki ni yoru taiki osen busshitsu no kaiseki - kisho tono kankei). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 5(1):115, 1970. (Proceedings of the Japan Society of Air Pollution, Annual Meeting, 11th, 1970.)

Multiple regression analysis was performed on a matrix of meteorological data and air pollution data for Tokyo. The air pollution data covered concentrations of nitrogen dioxide, nitric oxide, carbon monoxide sulfur dioxide, and suspended particulates. Meteorological data were atmospheric pressure at sea surface, temperature, vapor pressure, relative humidity, wind speed and velocity, cloud amount, present temperature, rainfall, and visibility. With respect to the relationship between the winter pressure patterns and air pollutant concentration, pollution becomes stationary and concentration increases when the migratory anticyclone is in transit or when the trough of atmospheric pressure is in transit. The pollution will be dissipated when the pressure pattern is the typical winter-type west-high and east-low and the pressure variation is the largest between lat 30-40 n and long 135-145 E, or when the cyclone passes by as it develops along the southern coast, or immediately after the transit of a front.

29636

Saychuk, V. I. and O. G. Narskikh

FORMATION OF FOG ON THE NUCLEI OF HUMIDITY CONDENSATION. (Obrazovaniye iskusstvennogo tumana na yadrakh kondensatsii vlagi). Text in Russian. Kolloidn. Zh., 2(9-10):801-806, 1936. 15 refs.

Laboratory tests were carried out to investigate the possibility of mist formation on hygroscopic nuclei of humidity condensation. The stability of mist formed and the effect of humidity on it were studied. The laboratory results were applied in the open air. It was possible to form a mist on hygroscopic nuclei of condensation at a relative humidity much lower than saturated. The following gases proved to be active in humidity condensation: sulfur trioxide, phosphorous pentoxide, nitrogen dioxide, nitrous oxide, and hydrochloric acid. The stability of mist formed is connected with the chemical nature of active condensation nuclei. Gases with considerable affinity to water form mist with large droplets. Stability of the mist depends on the size of droplets and is highest for medium-size droplets. The results showed that under certain conditions it is possible to form a mist on hygroscopic nuclei of condensation.

30338

Flohn, Hermann

CAN WE PRODUCE OUR OWN CLIMATE? (Produzieren wir unser eignes Klima)? Text in German. Meteorol. Rdsch., 23(6):161-164, Nov. /Dec. 1970. 18 refs.

Numerical estimates of all large-scale artificial sources and sinks of energy -- loss caused by atmospheric pollution, gain produced by fossil-fuel combustion -- show that man-made effects on climate can no longer be considered negligible. There has been a longer period of inadvertent climate modification caused by the activities of an increasing world population, mainly by destruction of vegetation in arid and semi-arid climates. One of the most urgent tasks of climatology is forecasting the effect of environmental changes. The task can be approached with numerical simulation models. (Author abstract modified)

30589

Benarie, M.

INVESTIGATION OF THE SYNOPTIC FORECASTING OF POLLUTION BY A STRONG ACID IN THE ROUEN REGION. (Essai de prevision synoptique de la pollution par l acidite forte dans la region Rouennaise). Text in French. Atmos. Environ., 5(5):313-326, May 1971. 18 refs.

Two synoptic criteria are defined for the prediction of high sulfur dioxide concentrations in the Rouen region of France: a period of 24 hours during which the mean wind velocity is less than 3.0 m/sec, and a forecast of a similar situation for the next day. At the present time, the proposed method, which uses only information contained in the daily forecast of the Meteorological Office, is the only practical method. The mathematical diffusion models and the empirical diffusion formulas need numerical weather data, which are not available for the next day. Thus, they cannot be effectively used in a particular forecast; they can only be verified in retrospect. The proposed empirical method allows pollution forecasting in calm periods. The mathematical diffusion models and empirical correlation formulas have singularities when the wind velocity approaches zero, and, therefore, cannot be used for calms. The r.m.s. error of the present method is less than that of mathematical models, even when calculated for days of the highest pollution in the winter. The principle of the proposed forecasting method is valid for other towns and regions, but the numerical data given only apply to the Rouen region. (Author abstract modified)

30691

Nakano, Michio and Jiro Narikawa

FORECASTING OF HEAVY SMOG IN OSAKA. (Konodo taiki osen no yoho). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 5(1):106, 1970. (Proceedings of The Japan Society of Air Pollution, Annual Meeting, 11th, Tokyo, Japan, 1970.)

Smog warnings are issued in Osaka at present after heavy pollution becomes apparent and nothing effective can be done toward its solution. Studies were conducted as to the accuracy of early forecasting as well as the characteristics of smog in Osaka in order to permit anti-smog measures. According to the past two-year records of forecasts made on the day before, accurate results were obtained generally in fair weather when: migratory high pressure covered the air and high pressure stayed behind and the low pressure approached from the Kyushu area. Predictions were often inaccurate when: the protrusion of high pressure was weak; Osaka was in the trough of pressures; or when the cold front was approaching. Accurate results can be obtained by the forecast made on the same day on all items except the last. The prevailing two types of smog are: a heavy smog in the morning and evening, caused by weak pressure inclination and by the land and sea breeze in the Osaka Plane; and day-time or morning smog caused by rain or gradient winds growing strong during the previous night.

30692

Nakajima, Chotaro

METEOROLOGICAL STUDY OF AIR POLLUTION (BROAD-SCALE FORECASTING). (Taiki osen no kishogakuteki kenkyu (koikiyoho). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 5(1):107, 1970. (Proceedings of The Japan Society of Air Pollution, Annual Meeting, 11th, Tokyo, Japan, 1970.)

Broad-scale, long-term weather and pollution forecasting is necessary to effectively prevent pollution. An extremely early prediction may not be possible, but a forewarning by at least several days of weather susceptible to heavy smog is desirable. The weather and smog patterns of each industrial area are different; for instance, long waves of air circulation passing near Japan seem to be closely connected with the pollution and atmospheric stability of Kyoto during winter. A long-term prediction is different from a short-term one in which a pollutant is assumed to diffuse endlessly into the atmosphere. The purpose of broad-scale forecasting must take in the possibilities of the appearance of pollutants at the least expected geographic areas. A prediction covering about a month requires a definition of types of dispersion according to the weather and types and volumes of daily pollutants. In a study of atmospheric circulation, pollutants serve as tracers; further studies must be made concerning their roles in energy-balance and absorption, reflection, and diffusion of various radiation by pollutants.

30752

Zel manovich, I. L. and K. S. Shifrin

TABLES OF LIGHT SCATTERING. VOL. III. COEFFICIENTS OF EXTINCTION, SCATTERING, AND RADIATION PRESSURE. (Tablitsy po svetorasseyaniy Tom III. Koeffitsiyenty oslableniya, rasseyaniya i luchevogo davleniya). Leningrad, Hydrometeorological Press, 1968, p. 3-12. 22 refs. Translated from Russian. Crerar (John), Chicago, Ill., National Translations Center, 20p., 1970 (?).

Tables containing four-figure values of the cross sections and coefficients of extinction, scattering and radiation pressure for spherical particles are presented. Calculations are based on specific formulas of the theory of scattering for spheres of arbitrary sizes. Section I pertains to transparent and absorbent spheres within a wide range of values of the diffraction parameter and the indices of refraction and absorption. The second section contains data for pure water droplets suspended in air and in third section contains data for an index of refraction less than unity. Accuracy of the tables is discussed and they are compared with tables given in other reports. (Author abstract)

30796

Graaf, H. de

SMOG: A DISCUSSION OF ATMOSPHERIC STABILITY TO AN ALTITUDE OF MORE THAN 30 AND LESS THAN 100 METERS FOR PERIODS OF 24 HOURS AND LONGER AND THE CORRESPONDING GROWTH OF SO2 AND SMOKE CONCENTRATION IN URBAN COMPLEXES. (Crondmist: Een beschouwing over stabiele luchtopbouw tot meer dan 30 en minder dan 100 meter gedurende perioden van 24 uur en langer, en de daarij behorende aangroei van de SO2 en rookconcentraties in stedelijke agglomeraties). Text in Dutch. Chem. Weekblad, 67(23):10-12, June 4, 1971. 20 refs.

Data on smog conditions in London and Rotterdam are compared, and the characteristics of this phenomenon are discussed. During the London pollution disaster of December 5-9, 1952, when mortalities were about 4000 above the normal death rate, the blanket of smog was only 75 m on the south side of London and 120 m on the north side, with an altitude of 45 m at Blackheath. The smokestacks of the power plant at Battersea were above the smog layer, and the plume was blown by an appreciable wind. The maximum diurnal smoke concentration was 4500 micrograms, and the sulfur dioxide concentration was 3600 micrograms per cubic meter. During the same period in Rotterdam, the fog was also heavy, but SO2 measurements were not made, although there were complaints of unpleasant odors to the Soil, Water and Air Commission. Studies of mortality rates, in which cardiovascular symptoms were treated separately, gave negative results when compared with the previous month. Studies were also made of the three-day smog incident that began January 29, 1959. Studies revealed an extremly stable atmospheric condition, SO2 readings of 650 micrograms per cubic meter and 140 micrograms of sulfuric acid. The maximum smoke concentrations for readings taken every hour were 500-550 micrograms. Another weather condition of the same type occurred on December 5, 1962 over Rotterdam. Sulfur dioxide measurments in five cities varied between 1000 and 1500 micrograms, while dust readings were between 400 and 450. Simultaneous SO2 readings in London, Paris, and even Milan were about 5000 micrograms per cubic meter. In this case, a study of medical statistics indicated some increased mortality during the smog epidemic; this was a little more evident when only the cardiovascular symptoms were considered. During the last week of February 1970, unusual weather conditions occurred, but no fog. High SO2 readings were obtained at Rotterdam, Vlaardingen, and Maassluis, but not at Amsterdam or The Hauge. This problem is discussed from the standpoint of fuels used in domestic heating and to power automotive vehicles, with a recommendation for greater use of natural gas and bottled gas, the latter both for heating and for vehicles.

31006

Foerchtgott, Jiri

MOVEMENT OF MINUTE PARTICLES OF SMALL INSECTS ACROSS THE KRUSNE MOUNTAIN RANGE. Meteorologicke Zpravy, vol. 4:14-16, 1950. Translated from Czech. Mundus Systems, Mc Gregor and Werner, Washington, D. C., 7p.

Certain types of mechanical turbulence are better suited to the dissemination of passive or semi-passive particles into the atmosphere. A thermal turbulence is characterized by only mild winds and clear weather, whereas a mechanical turbulence is characterized by strong wind over a broad vertical layer close to the surface. The vertical and horizontal shpae and extent of a mechanical turbulence are dictated by the location and shape of the obstacles encountered in the path of the air flow. With their southeasterly slopes, the Krusne mountains are ideally situated for the formation of wave-type air flow activity, particularly with a good brisk northwest wind. The possibility of greater deposits of particles and insects carried over from the windward side is limited to areas of calm because the areas of strong surface winds are more suitable as departure points rather than landing points. The most endangered region where particles would be likely to land is the valley of the river Ohre, which is where a permanent and virulent concentration of the potato blight has been observed.

31642

Walkenhorst, Wilhelm

A SIMPLE METHOD FOR STUDYING THE BEHAVIOR OF AEROSOL PARTICLES IN FLOW AROUND OBSTACLES. (Ein einfaches Verfahren zur Untersuchung des Verhaltens von Staubteilchen beim Umstromen von Hindernissen.) Staub, (Duesseldorf) 22(7):255-259, 1962. 8 refs. Translated from the German. Leo Kanner Assoc., Redwood, Calif., 17p., March 1971.

A simple method is described with which the local distribution of a dust suspension in a laminar air stream can be determined. After passing an obstacle or through a temperature or diffusion field, the dust is collected on a membrane filter on which an image of the obstacle around which flow occurs is produced. An example of a thermal field is provided to show that the new method is suitable for quantitative investigations. (Author summary modified)

33927

Rondia, D.

CLIMATIC FACTORS AND AIR POLLUTION IN URBAN CENTERS. (Facteurs climatiques et pollution de l air en milieu urbain). Text in French. World Met. Org. Tech. Note (Geneva), 108:238-247, 1970. 3 refs.

The direct and indirect influence of various climatic factors on emissions are discussed on the basis of air quality measurements made in biege, Belgium, and its suburbs in 1958-1959. The average differences between the hot and cold seasons provide an objective assessment of the amount of pollution from industrial and urban causes. For certain pollutants, such as carcinogenic polycyclic hydrocarbons, the differences are highly pronounced. The daily concentrations of the pollutants and their correlation with climatic conditions indicate the basic importance of meteorologic and topographic factors in dispersion. These facts indicate important approaches to abatement planning, and particularly to the development of forecasting and emergency systems. Certain forms of pollution are directly associated with population density. The wide dispersion area of industrial effluents is defined and the role of green spaces in the Liege area is assessed on a quantative basis.

33939

Fortak, Heinz G.

NUMERICAL SIMULATION OF TEMPORAL AND SPATIAL DISTRIBUTIONS OF URBAN AIR POLLUTION CONCENTRATION. National Air Pollution Control Administration, Research Triangle Park, N. C. and North Carolina Consortium on Air Pollution, Proc, Symp. Multiple-Source Urban Diffusion Models, Chapel Hill, N. C., 1969, p. 9.1-9.34, 14.8. 20 refs. (Oct. 27-30.) (APCO Pub. AP-86) NTIS: PB 198400

A multiple-source diffusion model for the simulation and prediction of long-term (climatological) ground-level sulfur dioxide concentrations in urban areas is described. The computer input consists of data from an emission source inventory together with statistics on relevant diffusion parameters. Because of the capacity of available computers, only a limited number of the largest emission sources can be treated individually. Smaller industrial emission sources are treated as residential sources. These are represented by a large number of stacks of the same dimensions for which the mean area emissions have been estimated. The meteorological input consists of data on wind direction, wind speed, and stability. The program also uses corresponding statistics for urban boundary layer depths and values for parameters affecting absorption at the earth s surface. The diffusion model used is basically Gaussian. It is modified, however, such that turbulent diffusion is restricted exclusively to the depth of the urban boundary layer. The rate of decay of sulfur dioxide is also taken into account. The model calculates fields of steady-state ground-level concentrations that correspond to a given spatial distribution of emission sources and to any possible combination of relevant meteorological diffusion parameters. Knowledge of frequency distributions of these meteorological diffusion parameters permits the derivation of frequency distributions of ground-level concentrations for any location within or outside of the metropolitan area. The computerized experiments simulate frequency distributions of ground-level concentrations for a great number of regularly arranged grid points (up to 2500 with a mesh size of 500 by 500 meters) and for a variety of time periods (months, heating period, seasons of year). Experiments to validate the model were conducted during the heating period in 1967-68 at four continuous monitoring stations that had been installed at special locations within the limits of the metropolitan area of Bremen. (Author abstract)

34191

Itoo, K.

METEOROLOGY AND AIR POLLUTION, IN PARTICULAR THE SIGNIFICANCE OF INVERSION STRATA. (Taiki osen to kisho, koto ni gyakutenso no igi). Text in Japanese. Naika, 21(5):820-822, May 1968.

The relationship between meteorological factors and air pollution is investigated. With periods of atmospheric stability, an inversion stratum acts as a cover and retains the pollution underneath, causing heavy smogs. Inversions in Japan occur during the winter, in periods of rain fronts or migratory pressure, and with wind velocity of less than 3 m. Stacks high enough to break through the inversion strata would enable the emitted pollutant to dilute before reaching the environmental atmosphere. The height of the inversion strata, however, cannot be accurately measured and the pattern of diffusion in the unstable air above the strata is unknown. Weather and pollution forecasting demand accurate data. Present smog warnings are issued too late, do not enforce the elimination of pollutants, and affect only the use of low-sulfur content fuels.

34751

Lyapina, O. A., Yu. N. Ogol, and N. N. Romanov

ATMOSPHERIC TURBIDITY AT THE FOOT-HILLS AND IN THE MOUNTAINS OF THE WESTERN EXTENSION OF TIEN SHAN ACCORDING TO HELICOPTER OBSERVATIONS. (Atmosfernyye zamutneniya po nablyudeniyam s vertoletr v predgoryakh i gorakh zapadnykh otrogov tyan-shanya). Text in Russian. Tr. Gl. Geofiz. Observ. (Leningrad), no. 189:154-159, 1966. 8 refs.

The dusty haze above the river network of the western Tien Shan at altitudes ranging between 100 and 1500 m and 1500 and 3000 m was explored by means of 17 helicopter expenditions performed during the July and August months of 1964. The haze distribution over the investigated region was graphically illustrated. The most intense turbidity was observed over the city of Tashkent. This turbidity was referred to as the aerosol lens because of its specific shape. The natural origin of this haze appeared to be combined with the industrial aerosols produced in the urban area of Tashkent. Local transfer of haze due to mountain and valley air currents were seen. The Northern and North-Western regions of the valley were less dusty than those of the South or South-Western regions. Both local and incoming haze stagnated within the lower 2-3 km altitude above the Fergana Valley due to the weakness of summer winds.

35037

Dezso, Szepesi

THE ROLL OF METEOROLOGY IN THE PRESERVATION OF THE CLEANLINESS OF THE ATMOSPHERE. (A meteorologia szerepe a levegotisztasag vedelmeben). Text in Hungarian. Idojaras (Budapest), vol. 74:513-530, 1970. 20 refs.

The most important role of meteorology in air pollution control work is the prediction of the frequency and amount of ground level emissions. Inventories of emission sources and a turbulent diffusion model are used on digital computers to provide three dimensional flow and temperature distributions and their variations as a function of time. The model uses a year s observed data. Input data includes the wind profile (based on five years), the stability (based on eight years), and the thickness of the mixing layer. A first approximation of the air pollution model for Budapest was calculated in 1969-1970 using the theoretical and experimental values. Peak values of two to twelve times the allowable norm were found in the inner city of Budapest for sulfur oxides, chlorides, nitrogen oxides, settling dust, and smoke. Predictions regarding the planned expansion of the Danube Thermal Power Station were presented; the influence of different stack geometries were explored. During the next few years, smog predictions will be made for Budapest.

35357

Fett, Walter and Erdwin Lahmann

EXTRAORDINARY CARBON MONOXIDE CONCENTRATIONS IN THE AIR OF MAJOR CITIES. (Aussergewoehnliche Kohlenmonoxid-Konzentrationen in Grosstadtluft). Text in German. Bundesgesundheitsblatt, 13(5):59-62, 1970. 10 refs.

During a 10-month period of continuous air pollution in a lightly-traveled street 3 km from the center of Berlin, the median half-hour carbon monoxide level of 8 ppm rose suddenly on Dec. 9, 1969 to very high levels, characterized by two peaks of 23 ppm. This high lasted for nine hours. The simultaneous half-hour SO2 concentration was 1.03 mg/cu m and the median three-hour dust fall was 0.47 mg/cu m. This episode coincided with the advent of a cold arctic air mass over Germany which spread over Berlin on December 9 and brought all air movement to a standstill. This extreme phenomenon indicates that under conditions of weather inversion emission clouds can form, possibly with their own circulation in which condensation processes and irradiation may play a stabilizing role. Under such circumstances, the atmosphere itself can erect barriers leading to a local accumulation of pollutants which otherwise are formed only by topographic interactions.

35420

Chirakadze, G. I.

THE CLIMATE OF TBILISI AND OF ITS NEW BOUNDARIES. (Klimat Tbilisi v novykh granitsakh. Text in Russian. Tr. Zakavkaz. Nauch.-Issled. Gidrometeorol. Inst., 26(32):3-75, 1967. 23 refs.

A tentative analysis of the climatic conditions of the city of Tbilisi and its surrounding areas is presented. Temperature, humidity, wind, sunshine and fog are being considered among the main meteorological factors affecting the air pollution of the city. The inversion phenomena developing in the lower section of the city, which is part of the Kura valley, lead to a weakening of the exchange processes and preclude the effects of turbulence on the ventilation of the city. Humidity affects the microclimatic condition of the city in that the existence of suspended dust particles (due to poor road conditions) in its air constitute the condensation nuclei for the formation of fog. Fogs are formed under conditons of 90% humidity, whereby a considerable increase in industrial waste gas concentrations in observed. Haze is considered to be the most specific fog for Tbilisi and is therefore being used as an indirect parameter in the assessment of the air pollution of the city. Rainfall and ventilation are considered to be the meteorological factors determining the removal of aerosols. Both, however, are compromised by long periods of lack of precipitation, ranging between 30-60 days during the summer or winter season and by the orographic features of the city. A program of intense research in the fight of air pollution due to local factors such as coal heating, industrial pollution, poor road conditions and waste accumulations from building activities, is recommended. It includes problems such as the sources of pollution, the chemical composition of aerosols, the admissible standards of pollution, the effect of aerosols on the biological and corrosive processes and the role of pollution for further urbanistic developments of the city.

35702

Bapseres, P. and J. Molenat

DISPERSION OF POLLUTANTS AND THE MICROCLIMATE AT LACQ. (Dispersion des polluants et microclimat a Lacq). Text in French. Ann. Mines (Paris), no. 11:21-30, Nov. 1970.

The natural gas discovered at Lacq in 1951 and exploited since 1956 is a mixture of hydrocarbons, CO2, and water vapor containing 15% hydrogen sulfide. Waste gas emitted into the atmosphere from the desulfurization of this gas and by-product recovery of sulfur contains 0.6% SO2, which under certain meteorological conditions causes widespread damage to feed crops, viticulture, and orchards surrounding Lacq. It was found that not the prevailing SO2 pollution level but rather the coincidence of several meteorological conditions characterized the days on which damage occurred. By analyzing temperature, humidity, wind direction and velocity, precipitation, and insolation and by correlating their levels with the damage to vegetation on certain days, criteria were defined which are helpful in forecasting weather conditions likely to cause damage to crops. When such conditions occur (fog, haze, inversion), an advisory is issued by the Regional Meteorological Center at Bordeaux to the station at Lagor which in turn advises the plant at Lacq. The plant then reduces operations temporarily to minimize damage to crops.

35991

Shiozawa, Kiyoshige, Atsushi Ootaki, and Shin-chi Okamoto

A STUDY ON THE RELATION BETWEEN AIR POLLUTANTS CONCENTRATION AND AIR PRESSURE DISTRIBUTIONS. (Taiki osen busshitsu nodo to kiatsu haichi no kankei). Text in Japanese. Waseda Daigaku Rikogaku Kenkyusho Hokoku Bull. Sci. Eng. Res. Lab., Waseda Univ., no. 53:131-138, 1971. 6 refs.

By a method of principal component analysis based on correlations between five air pollutants (dust, sulfur dioxide, carbon monoxide, nitric oxide, and nitrogen dioxide), an air pollution index was calculated and a relation was obtained between air pollutant concentration and air pressure distributions. In winter, air pollutant concentrations gradually increase when an anticyclonic movement is followed by a cyclone passing over Japan.

36062

Gedeonov, L. I. and O. A. Rys yev

USE OF COSMOGENIC RADIOISOTOPE MIGRATION PATTERNS IN THE STUDY OF THE PROPAGATION OF RADIOACTIVE CONTAMINATION IN THE ATMOSPHERE. 1967 (?). 16 refs. Translated from Russian in: USSR Reports on Natural and Fallout Radioactivity, p. 263-287. Atomic Energy Commission, New York, Health and Safety Lab. NTIS: AEC-TR-7128

Concentrations of beryllium(7), phosphorus(32), and sulfur(35) in surface air and in fallout were sampled by filter at a Leningrad station for four years from 1963 to 1966. Radioisotope concentrations varied with the season, reaching a maximum at the end of May and a minimum in October of each year. These patterns changed, however, with increasing precipitation or intensified deposits of cosmogenic radioisotopes from the stratosphere. S(35) fallout in 1963 included a sizable contribution from experimental explosions. Both S(35) and Be(7) showed a high correlation with theoretical estimates of mean annual fallout based on the rate of formation of cosmogenic radioisotopes during periods of minimal solar activity. A sharp deviation from the theoretical was observed for P(32). An analytical formula was derived for the annual course of the three cosmogenic radioisotopes in surface air and a curve was obtained showing the boundary between the interval of decrease and the interval of increase of concentration. Matching of stratospheric replenishments of concentrations against synoptic special features showed that altitude cyclones are one of the fundamental causes for the penetration of significant masses of stratospheric air.

36142

Aleksandrov, E. L., L. M. Levin, and Ju. S. Sedunov

ON THE GROWTH OF DROPLETS BY CONDENSATION ON HYGROSCOPIC NUCLEI. Tr. Inst. Eksp. Meteorol., no. 6:16-96, 1969. 9 refs. Translated from Russian by C. Long, National Lending Library for Science and Technology (England), 7p.

Numerical calculations made so far do not give a detailed picture of the growth of small particles since they take no account of factors such as the structure of a nucleus and the amount of soluble matter in it. Because these factors are important in the study of the condensation stage in the development of cloud spectra, detailed calculations were made on the basis of an equation describing the growth of droplets by condensation on hygroscopic nuclei. The results show that the growth of droplets on hygroscopic nuclei is appreciable even at humidities of 80-90% and that very small changes in relative humidity can play a significant role in the subsequent growth by condensation of nuclei from 0.5-one micron. Even when the necessary conditions for cloud or fog formation are absent, nuclei can increase their radii by a factor of two or three and produce great changes in atmospheric optical properties. If humidity departs by 0.01% from 100%, growth of 0.5-one micron particles may either cease because the equilibrium radius is reached or may continue indefinitely.

36176

Fuquay, J. J. and Ch. L. Simpson

USE OF METEOROLOGICAL MEASUREMENTS FOR PREDICTING DISPERSION FROM RELEASES NEAR GROUND LEVEL. Commissariat a l Energie Atomique, Saclay (France), Centre d Etudes Nucleaires, Pollut. Radioact. Milieux Gazeux, Proc. Symp., Saclay, France, 1963, p. 115-122. 16 refs. (Nov. 12-16.)

Meterological measurements were conducted for predicting dispersion from releases near ground level. The theoretical basis for summarization of exposure data in terms of travel time are reviewed. Results are presented for the decrease of maximum exposure and horizontal plume growth as a function of travel time. Prediction parameters are developed from meteorological measurements of vertical temperature profiles in the boundary layers and the wind speed and direction near release height. The local Richardson Number and the product of the wind speed and standard deviation of wind direction correlate well with the experimental data. A method is described for predicting exposures from protracted releases in which multimodal, flattened, or skewed distributions are often observed. (Author abstract modified)

36238

Mammarella, Luigi

ATMOSPHERIC STABILITY AND AEROSOL POLLUTION. (PROPOSAL OF A SIMPLE METHOD FOR EVALUATING THE CONDITIONS OF AIR STABILITY. Consiglio Nazionale delle Richerche, Rome (Italy), Inst. di Fisica dell Atmosfera, Rept. 36, 9p., Jan. 1971.

Atmospheric stability is essentially a function of temperature, relative humidity, and air movements. Static thermal inversions arise from a compression of the air masses at 600-1500 meters, while radiation inversions which can form at lower levels are more important with regard to pollution. In order to evaluate atmospheric stability, the entire day may be subdivided into four quadrants: night hours, sunset or sunrise, four hours after sunrise or sunset, and noon. The quadrants are assigned coefficients of zero, one, two, and three respectively. Next, the factors deriving mainly from the hygrometic state of the air are characterized by visibility and cloudiness, also with coefficients ranging from zero to three. The hygrometric state of the ground is defined as frozen (zero), wet (one), moist (two), and dry (three). The wind can be defined with velocities less than or equal to two m/sec, one m/sec, eight m/sec, and 16 m/sec, with coefficients from zero to three, respectively. By adding up the final coefficients, the atmospheric stability conditions may be deduced: between zero and four, inversion; four to eight, neutrality; and eight to twelve, conversion.

36307

Nomoto, H., Y. Kumazawa, T. Mizoguchi, Y. Ishikawa, and S. Maki

AN ANALYSIS OF AIR POLLUTION AND METEOROLOGICAL ELEMENTS IN OSAKA. (Osaka no taiki osen jokyo no ichikosatsu). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):124, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

During the winter of 1970, high pollutant concentrations lasting for three days occurred twice. The meteorological elements during these periods were examined with respect to the pressure pattern. The altitudes of 500 mb plane of the northern hemisphere were analyzed in comparison with the weather map on the ground surface. The variation in sulfur oxides concentration, wind direction and speed, and the amount of insolation during these three days are also shown by a diagram.

36428

Boeer, W.

THE APPLICATION OF METEOROLOGICAL DATA IN TOWN PLANNING, IN RELATION TO PROBLEMS ON AIR POLLUTION. (Die Anwendung meteorologischer Unterlagen bei der Stadtplanung in Hinsicht auf Problem der Luftverunreinigung). Text in German. International Union of Air Pollution Prevention Associations, Intern. Clean Air Congr. Proc., London, England, 1966, p. 79-81. 3 refs. (Oct. 4-7, Paper III/14.)

The application of meteorological data to the problem of air pollution in towns is reviewed. Air resource management and air pollution forecasting are examined with respect to statistical analyses of temperature inversions at ground level, structure of the wind field, and diffusion models.

36492

Ikeda, Y., M. Hiroaoka, and H. Todaka

AIR POLLUTION OF URBAN SCALE AND METEOROLOGICAL FACTOR. (Toshi sukeru no taiki osen to kisho yoso ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):127, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

The high atmospheric pollutant concentration is often associated with the atmospheric stagnation causing the pollutant accumulation. Based on meteorological data and sulfur oxides concentration recorded in Osaka City, the relationship between the atmospheric purification effect and meteorological conditions was quantified by classifying atmospheric pressure distribution patterns into eight types. The derivation of mathematical equations for the purification effect as functions of wind and time is discussed.

36494

Ootaki, Atushi, Kiyoshige Shiozawa, Shuichi Furuzono, and Shinichi Okamoto

STUDIES ON THE PREDICTION OF AIR POLLUTANT CONCENTRATION (II) - BASED ON METEOROLOGICAL FACTORS. (Taiki osen busshitsu no yosoku ni kansuru (II) - ichinichi go no nodo yosoku no kokoromi). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):125, 1971. 4 refs. (Presented at the National Council of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

The prediction of pollutant concentration is made based on the amount of pollutant released into the atmosphere, meteorological factors, and topographical factors. The prediction model based on the meteorological factors is discussed. The necessary conditions for this model are that the change in pollutant concentration is dependent on the concentration at a certain prior time, and that corrections are made with changes in meteorological factors. The statistical prediction formula which satisfies these condition is used for the prediction. The meteorological factors are relative humidity, wind direction, wind speed, visibility, atmospheric pressure, and temperature.

36495

Nakajima, Chotaro and Hideo Tagawa

PREDICTION OF AIR POLLUTION POTENTIAL IN KYOTO. (Kyoto bonchi no taiki osen yoho ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):126, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

According to the wind diagram of Kyoto basin indicating the wind speed and direction at different times of the day, relatively strong north-western wind is dominant in the afternoon while milder morning wind is mostly southernly. To investigate the effect of Osaka City on the air pollution in Kyoto, the change in sulfur dioxide concentration with time at six locations between Osaka and Kyoto city was measured during the period of Jan. 11 to 13, 1971. The SO2 concentration peak was shifted from Osaka toward Kyoto as the time of the day progressed. The geographical distribution map of SO2 concentration measured at two hour intervals indicates that the SO2 concentration is the highest in Osaka in the morning, in Yahata area in the afternoon, and in Kyoto city in the evening. However, the mode of pollutant migration is not clarified.

36501

Okita, Toshiichi, Kikuo Oikawa, and Yasumasa Ihara

OXIDATION OF SO2 BY PARTICULATES COLLECTED ON FILTERS. (Firuta ni hoshu shita biryushi ni yoru SO2 no sanka). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):247, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

The effect of particulate matter on the catalytic oxidation of sulfur dioxide in the atmosphere was studied by oxidation experiments. A glass fiber filter with particulate matter collected using a high-volume air sampler at various stations in Japan was immersed in distilled water, and a gas containing 10 ppm of SO2 was passed through at the flow rate of 3.5 l/min for one hour. A definite correlation was found between the amount oxidized and the concentration of some particulate matter; the correlation coefficient for sulfate equals 0.778; vanadium, 0.747; manganese, 0.667. The correlation coefficients of cadmium, lead, zinc, iron, and copper were extremely small.

36954

Lujanas, V. and S. Salavejus

DETERMINATION OF VERTICAL DISPLACEMENT OF AIR MASSES USING THE RADIOACTIVE ISOTOPES. (Opredeleniye vertikal nykh pevemeshcheniy vozdyshnykh mass pri pomoshchi radioaktivnykh izotopov). Text in Russian. Academy of Sciences, Lithuanian SSR, Inst. of Physics and Mathematics, Investigations of Atmospheric Self-Scavenging Processes from Radioactive Isotopes, Proc. Conf., Palanga, Lithuania, 1966, p. 37-41. 2 refs. (July 7-9.)

Vertical air displacement was determined using the radioactive tracers sodium(22) and beryllium(7). On several occasions in

May 1965, the ratio of sodium(22)/beryllium(7) reached values characteristic of stratospheric air. A special coincidence-spectrometer was used to determine sodium(22) concentrations, while beryllium(7) was measured at the 478 kev gamma-line.

37024

Israel, H.

ATMOSPHERIC ELECTRICITY. VOLUME I: FUNDAMENTALS, CONDUCTIVITY, IONS. (Atmosphaerische Elektrizitaet). Probl. Kosm. Phys. (Germany), vol. 29, 1957. 841 refs. Translated from German by D. Ben Yaakov and Baruch Benny. Israel Program for Scientific Translations, Jerusalem, 317p., 1970. NTIS: TT-67-51394-1

The physics of gaseous ions and submicroscopic suspensions are reviewed from the standpoint of laboratory and field experience. Normal and other ionization processes and the mobility, adsorption, diffusion, and recombination of ions are discussed. Processes occurring in an ionized gas under the influence of an externally applied electric field are indicated. Current-voltage characteristics and the electrode effect are considered. The motion of ions is noted and the phenomenon of nonselfsustaining discharge at reduced pressure is discussed. Luminescent phenomena are described. Charge carriers, types of discharge, and ignition are discussed for self-sustaining discharge. The conductivity of the atmosphere and its origin, and electrostatic measuring devices and measuring techniques for conductivity, ions, suspensions, and radioactivity are considered.

38609

Caspar, J. W.

THE IMPORTANCE OF METEOROLOGICAL PARAMETERS FOR QUESTIONS OF AIR POLLUTION. (Die Bedeutung meteorologischer Parameter fuer Fragen der Luftverschmutzung). Text in German. Preprint, Deutscher Wetterdienst, Offenbach/Main (West Germany), 9p., March 1972. (Presented at the Fachtagung Umweltverschmutzung, Frankfurt/Main, March 21-24, 1972.)

The dilution of emissions depends on the wind and on the temperature layering. The pollution in the immediate vicinity of a pollution source is higher during weaker winds. With stronger winds the pollutants are carried to more distant areas, so that lower concentrations are found in the immediate vicinity. With high temperature lapse rates, e.g., 1 C per 100 m height, the turbulence is high and the pollutants are carried to higher altitudes by intense vertical exchange. The lowest vertical pollutant transport occurs during temperature inversions. An illustration of plume behavior during various temperature lapse rates and at inversion is given. The knowledge of meteorological conditions for air exchange is important in two fields, for the smog alert service and for the creation of master plans for industrial centers and residential areas. In the Federal Republic of Germany all meteorological paramaters which are important for evaluation of the degree of pollution on the ground level are monitored by the Deutschen Wetterdienst. Various states of the Federal Republic of Germany have a smog alert service. North Rhine Westphalia has provided such service ever since April 1964. It is important to know the ventilation conditions prior to the creation of master plans. This knowledge helps to prevent the erection of a new residential section on the leeward side of an emission source.

F. BASIC SCIENCE AND TECHNOLOGY

05440

R. Gelius and W. Franke

AN INVESTIGATION OF THE COMBUSTION PRODUCTS OF ALKYL-LEAD COMPOUNDS. NNZur Kenntnis der Verbrennungsprodukte von Alkylbleiverbindungen.)) Brennstoff-Chem. Essen 47(9) 280-5, Sept. 1966. Ger.

Tetramethyl-, tetraethyl-, and tetra-n-propyl lead were burned in air in the presence of n-n-heptane, isooctane, or benzene. The combustion products were collected on the surface of a cooled glass tube, in a glass wool filter, and in an electrofilter. In order to eliminate the formation of nitrites, the nitrogen in the air could be replaced by argon. The combustion of the alkyl lead compounds takes place as follows: the compounds thermolyze when the combustible mixture approaches the hot regions of the flame. The result is a smoke of fine PbO particles. The combustion residues are then almost identical to those from the alkyl lead mixture. In the third zone, behind the flame, PbCO3(52-86%), Pb0(13-45%), Pb02 (as Pb304, etc. 0.1-3%), and Pb(N02)2 is formed. In internal combustion engines the effectiveness of PbO as an antiknock agent lasts about 1 millisecond. These experiments suggest that the surfaces of the PbO particles may convert to Pb(NO2)2, thereby rendering the antiknock additive ineffective.

11554

Bricteux, J., W. Fasotte, and P. Ledent

A METHOD FOR SAMPLING AND DETERMINING HEAVY HYDROCARBONS IN COMBUSTION FUMES. (Mise au point d'une methode de prelevement et de dosage des hydrocarbures lourds dans les fumees de combustion.) Text in French. Ann. Mines Belg. n(3):309-331, March, 1968. 16 refs.

A method has been devised for sampling and measuring heavy hydrocarbons in combustion smokes. The sampling technique is based on the adsorption of the hydrocarbons on a short adsorbent column placed within the chimney itself. The smokes can be drawn up through the sampling tube in less than one minute with the help of a rubber syringe. In order to measure the hydrocarbons collected, the sampling tube is inserted in a carrier gas circuit which also includes a flame ionization detector. The tube is brought up to a high temperature in a mobile oven. The hydrocarbons are desorbed and carried by the carrier gas towards the dector; there is no separation of the hydrocarbons and the response appears in the form of a single peak on the recording paper. It is possible to desorb hydrocarbons having a boiling point above 500 degrees C without inducing cracking phenomena. The output, which depends on the boiling temperatures of the sampled hydrocarbons, is excellent and can be still further improved if, prior to the sampling, the tube is refrigerated. A quantity of 10-6g anthracene produces a peak allowing accurate quantitative determination of the compound. The method also makes possible to perform a detailed analysis of the sample and determine the individual concentrations of the various components. For this purpose, a chromatographic column must be inserted into the carrier gas, between the sampling tube and the detector. Several examples of the determination of total and individual concentrations in various synthetic gas mixtures, combustion smokes, cigarette smoke, automobile exhaust, are presented. The possibility of applying the method to the measurement of benzo(a)pyrene is being considered. Another method for assessing the sample by methanol elution followed by a spectrophotometric examination is also described.

11933

Georgii, Hans-Walter

INVESTIGATION OF THE AIR EXCHANGE BETWEEN ROOMS AND THE AIR OUTSIDE. (Untersuchung ueber den Luftaustausch zwischen Wohnraeumen und Aussenluft). Arch. Meteor., Geophys., Bioklimatol., Ser. B, vol. 5:191-214, 1954. 17 refs. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 38p.

Self-ventilation of rooms as a function of outside wind conditions was investigated with an attempt to distinguish ventilation through pores from air exchange through cracks around doors, windows, and in the floor. The affect of wind direction and inside-outside temperature difference on the volumetric air exchange were estimated. Decreases, with time, of experimentally established levels of water vapor, carbon dioxide, and aerosols in the rooms were measured. Complete exchange of the entire air volume of a standard room in one hour (ventilation coefficient equal to 1.0) required a wind velocity of 6-7 m/sec, a value which rarely occurs in cities. An average ventilation coefficient of 0.46 was obtained in carbon dioxide studies. Dependence of self-ventilation on wind direction could not be established. It is concluded that wind velocity is decisive in air for rooms on higher floors, but is negligible for basement and ground-floor rooms where inside-outside temperature is the determining factor. Naturally, these two factors overlap at intermediate heights.

12341

Gruenewald, Gerhard, Olga Simonova, and Otto D. Creutzfeldt

DIFFERENTIAL EEG-ALTERATIONS DURING VISUOMOTOR AND COGNITIVE TASKS. (Differentielle EEG-Veraenderungen bei visuomotorischen u kognitiven Taetigkeiten). Arch. Psychiat. Nervenkrankh. (Berlin), vol. 212: 46-49, 1968. 34 refs. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 34p., May 1, 1969.

An investigation is described of the variables which may produce changes in brain-wave patterns on electroencephalograms (EEG) during mental activity and periods of selective attention in humans. The EEG's of the precentro-central (PC) and occipito- temporal (OT) areas were recorded with telemetry, and their changes during six standardised visuomotor and two cognitive tasks were compared with the EEG during rest with open eyes. Automatic EEG analysis on the principle of zero-crossing and interval analysis was used. The EEG changes during tasks differed significantly in the PC and OT areas, and showed a dependence both on individual factors (type of resting EEG with the eyes open) and on the characteristics of the tasks. On the other hand, they were not correlated with the degree of attention or concentration involved in the performance of each task. Detailed data analysis produced evidence of a differentiation between EEG reactions to different tasks. The PC alpha-rate showed the least decrease during cognitive tasks, while the OT alpha rate showed the highest tendency towards activation during maze drawing with direct or mirror image control. The occipital beta-activation was lowest during writing without visual control. (Author abstract modified)

13178

Peter, S. and H. Woy

SULFUR PRODUCTION FROM HYDROGEN SULFIDE WITH THE CLAUS PROCESS. (Gewinnung von Schwefel aus Schwefelwasserstoff nach dem Claus-Verfahren). Text in German. Chem. Ing. Tech., 41(1-2): 1-7, Jan. 17, 1969. 9 refs.

About 92 to 94% of sulfur is obtained from the H2S of natural gas by the Claus process. The remaining 6 to 8% sulfur is presently emitted with the waste gas as SO2. With the stringent air pollution control laws which are now being introduced in all industrial countries, it becomes necessary to increase the sulfur output to 97%. Computation of the dissociation equilibria in the sulfur vapor of the Claus process showed that higher outputs can be achieved if the gas is cooled to about 220 C prior to entering the first Claus reactor. If the reaction gas contains COS and CS2, these compounds must be hydrolyzed in the first contact process. As a consequence, the temperature in the feactor increases. With a hydrogen sulfide content of 70% by volume, the theoretical sulfur output at the first contact process would be 91%. To obtain an optimum output, the second contact process must then take place at the lowest possible temperature. The proper input temperature at the second Claus reactor was found to be 187 C. Waste gas from the second reactor is freed from the remaining elementary sulfur in a scrubber operated with liquid sulfur at 120 C and goes to an afterburner, where the remaining H2S is converted to SO2. It is theoretically and practically possible to increase the sulfur output of the Claus contact process to 97% by the use of a highly active alumina catalyst so that the SO2 concentration in the waste gas is less than 0.5% by volume. By further decreasing the operating temperature in the Claus reactors, better results could be achieved, although this is not advisable in the presence of CO2. Prerequisite to such a successful operation is the exact adjustment of the stoichiometric amount of primary air in the combustion chamber.

13614

Takeuchi, Nabuhiko

A STUDY OF THE ABSORPTION OF SO2 IN WATER BY LIQUID JET. Translated from Japanese. (Source Unknown), p. 41-45, July 4, 1968

The diffusion coefficient of SO2 has been measured at 30 degrees C by using a liquid jet out of a bell-shaped nozzle. Six glass nozzles were used with pore sizes between 0.11 and 0.06 cm in diameter. The liquid jet was about 2 cm long and was in contact with SO2 gas from 2.9 times 10 to the minus 3 to 1.7 times 10 to the minus 2 sec. The amount of absorbed SO2 was determined by potentiometric titration with KMnO2 under slightly alkaline conditions. The actual value agrees well with those values calculated using Scheible's formula.

13617

Langemann, Horst

MASS AND MOMENTUM EQUATION OF ISOTHERMAL NON-ISOBARIC GAS-LIQUID- PHASE-REACTORS. II. (Massen-und Impulsbilanzgleichungen isothermer nichtisobarer Gas-Fluessigphasen-Reaktoren. II.) Translated from German. Brennstoff-Chem. (Essen), 49(10):312-315, Oct. 1968. 26 refs.

A model is described, which can be used to establish the momentum equation of a gas-liquid phase reactor with counterflow of the phases. The basis of the momentum equation is the second law of motion by Newton, which in this case means: The temporal change of momentum of a mass element is equal to the vectorial sum of external forces acting upon it.

13618

Reh, L.

FLUIDIZED BED INCINERATION. (Verbrennung in der Wirbelschicht.) Translated from German. Chem. Ing. Tech. 40(11):509-515, 1968. 12 refs.

The use of fluidized bed incineration is limited, among other things, by the combustion temperature, the caloric value of the fuel and the gas velocity in the turbulent layer. By adequately controlling the combustion process a very narrow temperature range can be maintained, which is demonstrated by various examples (roasting of sulfide ores at various types of cooling, regeneration of pickling bath, incineration of oil and waste sludge).

13619

Irzhanov, S. D. and Kh. Zh. Zhumatov

USE OF ORGAN CULTURES FOR STUDY OF RESPIRATORY DISEASES. A PRELIMINARY REPORT. Translated from Russian. Vop Virus, No. 2:246-250, 1968. 18 refs.

Significant advances in the diagnosis of respiratory viral diseases have been made using cell and tissue cultures. This paper discusses the materials and methods used, and gives the results of two (2) experiments using the lungs of guinea pigs. It is concluded that organ cultures of lungs of embryos of laboratory animals and of man may serve as one of the models possible for experimental study of the histopathology of pulmonary infections by acute respiratory virus diseases. This likewise concerns the pathogeny of mixed viral-bacterial pneumonia. Organ cultures permit the revealing of character changes in alveolar epithelia and in the walls of the bronchioles in the first hours and days of contact with the virus, with the architectonics of the lung tissue being preserved.

13620

Stouff, M. L.

STOUFF'S SUSPENSION COMBUSTION HEARTHS. (Les foyers a combustion en suspension Stouff.) Translated from French. Institut Francais des 0Combustibles et de l'Energie I.F.C.E. p. 341-351, (1968).

A suspension-combustion hearth is discussed which was developed by M. O. Stouff and has been in operation for several years. Emphasis is placed on principles of design, operational procedures, performance results, and recent special applications (thin anthracite coal, and the drying of very damp combustibles).

13936

Davtyan, O. K. and Ye. N. Ovchinnikova

CHEMISORPTION AND OXIDATION OF SULFUR DIOXIDE ON SOLID CATALYSTS AT NORMAL TEMPERATURE. (O khemisorbtsii i okislenii sernistogo angidrida na tverdykh katalizatorakh pri normal'noy temperature). Text in Russian. Doklady Akad: Nauk SSSR, 104(6):857-860, 1955.

An attempt was made to explain the catalytic oxidation of sulfur dioxide on the basis of a theory proposed by O. K. Davtyan. The following catalysts were studied: spongy platinum applied to porous phosphorus through reduction from a solution of chloroplatinic acid, activated charcoal, vanadium pentoxide obtained by coagulation of a colloidal solution in the form of a powder (without carrier), powdered graphite, powdered chromium trioxide, and powdered ferric oxide (listed in order of decreasing activity). In all cases, chemisorption was found to proceed with sufficiently high rate at room temperature, the oxidation products being readily removed as sulfuric acid by washing with water. Curves of total adsorption and chemisorption rates as a function of time were plotted. It is noted that the presence of water vapor on the catalyst surface usually increases the maximum quantity of oxidized sulfur dioxide.

14391

Kiselev, A. V.

NATURE OF HYDROCARBON ADSORPTION ON GRAPHITE, OXIDES, HYDROXIDES, AND CHEMICALLY MODIFIED SURFACES. (Priroda adsorbtsii uglevodorodov na grafite, okisyakh, gidrookisyakh i khimicheski modifitsirovannykh poverkhnostyakh). Text in Russian. Gaz. Khromatogr., Tr. Pervoi vses. Konf., Akad. Nauk SSSR, Moscow, 1959, p. 45-80. 61 refs.

Considerations necessary for a better theoretical and practical understanding of chromatographic separation of hydrocarbons are presented. Topics examined are: absorption energy of hydrocarbons on graphitized carbon black and magnesium oxide; absorption energy of hydrocarbons on hydroxides; adsorption isotherms for individual hydrocarbons on a uniform surface; effect of chemical modification of absorbent surface on the absorption of hydrocarbons; effect of geometrical modification of absorbents--creation and alteration of surface--on the absorption of hydrocarbons. It is recommended that further work center on the following items: theory of adsorption forces, calculation of adsorption energy, measurement of heat of adsorption at different temperatures; statistical theory of adsorption equilibria, measurement of heat capacity of adsorption systems; investigation of the state of surface chemical compounds and adsorption complexes using infrared spectra and other new methods; investigation of the geometric structure of adsorbents and structure modification; investigation of the chemical structure of surfaces and their chemical modification; investigation of adsorption equilibria for gas mixtures, especially by the vacuum circulation method using new adsorbents.

14467

Haenel, Gottfried

OBSERVATIONS ON THE THEORY OF JET IMPACTORS. (Bemerkungen zur Theorie der Duesen-impaktoren). Text in German. Atmos. Environ., 3(1):69-83, 1969. 15 refs.

The familiar theory of jet impactors is valid only for spherical particles at low Reynolds numbers. Exact application of this theory to non-spherical particles in jet impactors is not possible. Therefore, the impactor theory was modified and is now based on the equation of motion of non-spherical particles at conditions occurring in jet impactors. Aerodynamic drag coefficients and form factors of a number of particle shapes are discussed. These factors, together with their variation with Reynold's and Mach's numbers, are contained in a special inertia coefficient. It is shown how the collection efficiencies of impactors are calculated from the solution of the equation of motion of particles. It is possible now to explain the differences between the impactor calibrations of Ranz and Wong and of Stern et al. Calculations on the influence of particle shape and density on the impaction process show that jet impactors and other sampling instruments based upon the inertia principle are not capable of measuring the size and the number of atmospheric aerosol particles in absolute terms.

14693

Jonderko, Gerard and Zbigniew Szczurek

PATHOMORPHOLOGICAL STUDIES OF INNER ORGANS IN EXPERIMENTALLY INDUCED MANGANESE POISONING. (Pathomorphologische Untersuchungen innerer Organe bei experimenteller Manganvergiftung). Text in German. Intern. Arch. Gewerbepathol. Gewerbehyg. (Heidelberg), 23(2):106-116, 1967. 25 refs.

Fifteen male rabbits aged 6 to 12 months received daily intravenous doses of 3.5 mg manganese as 1% MnCl2 in 0.15 M NaCl solution for up to 32 days. Symptoms began to appear after the first week. The animals became excited and aggressive. This stage was followed by apathy and refusal to eat. At the end of the intoxication period, tremors of the head and legs were observed in two rabbits, two had equilibrium difficulties, one salivated, and three had died. All animals were decapitated, including the five control animals. One hour after death, tissue samples were taken from the liver, spleen, lung, kidneys, large intestines, pancreas, adrenal glands, and the scrotum. Pathomorphological changes were found in all organs. They were filled with blood and hyaline thrombosis was diagnosed. The largest changes were found in the liver parenchyma. Various degrees of decay to necrosis were found, accompanied by inflammation. The microscopic pictures looked similar to acute liver cirrhosis. The kidney and the large intestines were the least damaged organs. Degeneration of the nephrons and inflammation of the mucous membrane were seen. The toxicity of manganese to several organs can be explained by its toxic effect on the central nervous system and on the blood vessels.

16572

Sugiyama, Kozo and Takehito Takahashi

PRODUCTION OF CHLORIDE GAS BY OXIDIZING POTASSIUM CHLORIDE AND SULFUR WITH PYRITE. (Enka-kariumu, pairaito oyobi yuo no sanka ni yoru enso seisei hanno). Text in Japanese. Kogyo Kagaku Zasshi (J. Chem. Soc. Japan), 68(3):433-437, 1965. 9 refs.

In the production of chloride (Cl2) by oxidizing KCl and S, the addition of pyrite (FeS2) increased the reaction velocity by maintaining a high temperature; it also increased the sulfur source as FeS2 and produced Fe3(SO4)3 as a catalyzer to oxidize SO2. The pyrite included 42.4% Fe and 42.9% S. The KCL and S were placed in a quartz cylinder, the internal volume of which was 212 cu cm, and oxygen gas was sent into this cylinder to oxidize materials, after which the materials were heated by an electric hearth at 500 to 800 C. The higher temperature showed larger reaction velocity (the reaction velocity at 700 C was twice as much as that at 500 C). There was little influence of the particle sizes of KCl and FeS2 on the production of Cl2. The reaction increased rapidly between 70 to 100 minutes after it began. The amount of sulfur to produce Cl2 was maximum when the weight ratio between pyrite and S was one to one, and it increased with the small amount of material compound when the compound had a definite weight ratio of KCl, S, and pyrite. Eventually the production ratio of Cl2 from KCl was 55 to 80% when the weight ratio of pyrite to KCl was 10 to 30%, the reaction temperature was 600 to 700 C, and the reaction time was 2 to 3 hours. This process produced K3Fe(SO4)3 and a mixture of K3Fe(SO4)3 and KCl, as determined by roentgenological analysis of rapidly frozen intermediate products.

16658

Takeuchi, Nobuhiko and Yoshiya Namba

ABSORPTION OF SULFUR DIOXIDE. p. 241-250, 1964 (?) 16 refs. Translated from Japanese. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 15p., July 1969.

The measurement of the rate of sulfur dioxide absorption into a laminar jet was performed to investigate the effect of chemical reaction between SO2 and OH(-) in liquid phase on the rate of SO2 absorption from gas phase, and also the mechanism of chemical reaction between SO2 and OH(-) in liquid phase. Flow in the jet was shown to be uniform and parallel with the axis, with absorption taking place according to the basic equation of diffusion. The effect of chemical reaction on the rate of gas absorption was expressed by the following equation: beta yields 1 plus 0.88q(1.2), where beta is the ratio of mass transfer coefficient accompanied by chemical reaction to the coefficient without it, and q, the ratio of the initial concentration of OH(-) to the saturated concentration of SO2 in solution. This formula greatly resembles the theoretical equation, derived under the assumption of instantaneous irreversible second-order reaction, except for a slight difference in the power of q. It is therefore concluded that within the present time range of contact time, SO2 is absorbed into NaOH aqueous solution with instantaneous irreversible second-order reaction, and that the effect of the chemical reaction on the absorption velocity is expressed by the equation given above. (Author summary modified)

17364

Wickert, K.

TESTS ON FORMATION OF FECL2 AND FECL3 BY REACTIONS BETWEEN FE, FE304, FE203 AND HCL-CONTAINING GASES. (Versuche zur Bildung von FeCl2 und FeCl3 aus Fe, Fe304, Fe203 and HCl-haltigen Gasen). Text in German. Mitt. Ver. Grosskesselbesitzer, 49(6):449-52, Dec. 1969. 5 refs.

The reaction of hydrogen chloride containing gases with pulverized Fe, Fe304, and Fe203 was studied with respect to temperature. Moreover, the influence of water vapor and oxygen in the HCl- containing gases on the raction with the above mentioned substances was studied with respect to temperature. For each experiment, 0.3 g of the pulverized substances were heated in the presence of pure nitrogen. Each experiment lasted 4 hours. The HCl- containing gas (100 cu cm/min) was passed with a speed of 0.44 cm/sec through the reaction chamber at a temperature of 22 C. The reaction products were cooled to room temperature and the weight changes of the substances were determined. The reaction of Fe203 with N2 containing 5% by volume HCl forms FeCl3. The fraction of solid FeCl3 decreases with increasing temperatures while the volatile FeCl3 increases with the temperature. Below 320 C, volatile and solid FeCl3 are formed. The reaction of Fe with the gas forms FeCl2. Above 670 C, no solid FeCl2 is found. Above 580 C, FeCl2 is increasingly sublimated. The reaction with Fe304 forms FeCl2 and FeCl3. The former develops primarily at low temperatures. The maximum FeCl2 formation takes place between 200 and 250 C. The FeCl3 is sublimated at 300 C. The reaction of Fe304 with N2 containing 10% H2O and 5% HCl forms solid FeCl2 up to 550 C. No reaction takes place between 550 and 700 C. Above 300 C, FeCl3 and FeCl2 form which are immediately converted to Fe203 through the influence of water vapor. The reaction with Fe forms no Fe203 only Fe304. Oxygen in the gas like the water vapor impairs the HCl reaction with Fe, Fe203, and Fe304. The presence of water vapor in addition to HCl form volatile and non-volatile chlorides but to a much lesser extend than in the presence of HCl alone in the gas. Oxygen further reduces chloride formation.

17588

Douzou, Pierre, Jean Capette, and Jean-Pierre Gout

STUDY OF THE CHEMICAL PRODUCTION OF SINGULAR OXYGEN BY CHEMILUMINESCENCE. C. R. Acad. Sci., Paris, Ser. C, vol. 266:993 996, April 1, 1968. 5 refs. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 6p.

A method permitting deliberate chemiluminescence from the application of singular oxygen was studied and the intensity was used for spectral analysis. The decomposition of hydrogen peroxide by hypochlorite liberates molecules of singular oxygen which are characterized by remarkable spectroscopic properties and by chemiluminescent emission. The chemiluminescence indicates the involvement of oxygen during reactions in which it appears accidentally. The technical aspect of chemiluminescence was discussed. To influence the kinetics and intensity of luminescence, the transition complex X-O2 was stabilized by cold. Hydrogen peroxide decomposition on FMN (flavine mononucleotide) was carried out at 20 C. The graph contained two curves which were obtained by temperature variations between 0-35 C. The emissions were induced after some waiting time at 0 C amounting up to 25-30 minutes. During this period, a progressive inhibition of FMN fluorescence was recorded. After a second experiment in which H2O2 and luminol were mixed, a lightning of chemiluminescence at 0 C and an emission which produced heating and decomposition of the transition oxide was observed. Using interference filters, two consecutive emissions containing radiations centered at 6335 A and at 4350 A were observed. An improvement of the sensitivity and specificity of the spectral analysis is necessary for possible evaluation of the percent of both radiations emitted in the two cases.

17594

Okaniwa, 0Keiji and Jintaro Suzuki

FLUIDIZED COMBUSTION OF SOLID FUELS. (Funkyu ryudo nensho). Nenryo Kyokaishi (J. Fuel Soc. Japan, Tokyo), vol. 38:429-437, 1959. 7 refs. Translated from Japanese. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 17p., May 16, 1969.

Various solid fuel combustion experiments were conducted on commercial scale experimental combustion equipment for the purpose of application of low grade fuels. Hokusyo coal and other fuels were chosen for sample fuels. The development of new combustion mechanisms by aerodynamical and thermodynamical principles of fluidized reactions were explored. The method is very useful as a combustion process for burning the high ash contents and the low generation of heat (about 2500 kcal/kg) of low grade coal. Even the hard coal and the stone abandoned in coal selection can be used as the fuel. Fairly crude coal can be used; thus, it is possible to adjust the micro-coal machine to a small size and to decrease the installation, operation, and maintenance costs. The micro particle combustion section in the upper part of the combustion chamber and the fluidized combustion in the lower part proceeds concomitantly, makes the combustion stable, and enables the control of change of loss of heat. With this method, large amounts of micro particles produced at the coal selection may be used without passing the micro coal machine. Good results were obtained for several experiments. (Author conclusions modified)

17619

Nakoryakov, V. Ye.

COMBUSTION OF LIQUID FUEL DROPS IN A SOUND FIELD. Inzh. Fiz. Zh. Akad. Nauk Belorussk. SSR, 12(5):650-656, 1967. 8 refs. Translated from Russian. Foreign Technology Div., Wright-Patterson AFB Ohio, Translation Div., 10p., March 11, 1968.

The combustion of a single drop of liquid fuel in a sound field is analyzed theoretically. Because of the influence of chemical reactions of combustion and of the transverse flow of evaporating fuel vapors, the process is much more complicated than that of 'pure' mass transfer between a medium and a sphere. An approximate method for calculating combustion rates is proposed. The method is valid, provided that certain restrictions are imposed on the values of the dimensionless complexes characterizing the process. The dimensionless evaporation rate is shown to depend linearly on the amplitude of particle velocity of the medium and to be inversely proportional to the square root from the frequency of oscillations. A formula is derived which relates combustion rates to the sound oscillation parameters and to the intensity of the transverse flow of evaporating vapors.

17921

Reppe, Walter, August Spaeth, and Hans Krzikalla

METHOD FOR THE PRODUCTION OF ORGANIC SULFUR COMPOUNDS. (Verfahren zur Herstellung von organischen Schwefelverbindungen). Text in German. Farbenindustrie (I. G.) A. G., Frankfurt, Germany, W. German Pat. 742, 741. 2p., Oct. 27, 1939. 1 ref. (1 claim).

For producing organic sulfur compounds by conversion of hydrocarbons or halogen containing hydrocarbons with a halogen and sulfur dioxide in the presence of catalysts, it is advantageous to use those halides as catalysts which favor the halogenation to carbon. The following halides can be used: the chlorides of iron, copper, nickel, tin, titanium, zirconium, bismuth, boron, antimony; phosphorus iodide; and the halogen compounds as sulfur. Saturated paraffins such as cetan can be used for hydrocarbons, those obtained at the catalytic hydrogenation of the oxides of carbon at normal or increased pressure, those which arise at the separation of water from oxygen containing products of the catalytic hydrogenation of the oxides of carbon and hydrogenated, or polymerized olefins. The temperature of the process should not exceed 50 C.

18227

Diomaiuto-Bonnand, J., and D. Nicolas-Prat

PLANT MORPHOLOGY. (Morphologie Vegetale - Structure et evolution des bourgeons neoformes in vitro, Bourgeons neoformes sur hampe florale chez le Nicotiana sylvestris en photoperiode inductive.) Translated from French. C R Acad. Sci., Paris, Ser. D., p. 1482- 1484, November 13, 1967. 6 refs.

The evolution of neoformed buds in Nicotiana sylvestris was studied in the inductive photoperiod, under conditions most favorable for the initiation of floral buds of Nicotiana tabacum 'Wisconsin 38'. Grown in vitro in a nutritive Knop composition containing agar and glucose and illuminated from 9 to 16 hours per day, plant fragments were analyzed at regular intervals using standard histological techniques. Fragments taken from the plants formed buds from the resulting callus. The morphological appearance of the buds was independent of glucose concentration in the growth medium, length of lighting periods, and place of sampling in inflorescence. Eight plates show views of sectioned specimens. Although formed in euperiod in composition rich in sugar, the buds were vegetative and comparable to those formed in dysperiod in a composition poor in sugar. Observations indicated that glucose does not cause flowering in vitro but favors it when induced. The evolution of neoformed buds is similar to the growth of apical meristems of entire plants until the reproductive phase, when the meristem stops functioning and becomes parenchymatous, and leaves yellow and wither.

18228

Gourgaud, Monique

PLANT PHYSIOLOGY. (Physiologie Vegetale - Action de la 8-azaguanine et de la guanine sur la croissance et la ramification du protonema de Ceratodon purpureus.) Translated from French. C R Acad. Sci., Paris, Ser. D, p. 1381-1383, 1967. 9 refs.

A ceratodon purpureue protonema grown in darkness in a composition containing glucose and 8-azaguanine (0.000032M.) in vitro loses some of its power of branching, while its lengthwise growth remains unchanged. Guanine added to the inhibiting composition in a concentration of 0.0000066M. restores normal branching. Since this phenomenon is not found in the presence of 5-FUDR, the 8-azaguinine appears to be an inhibitor of the synthesis of RNA. The 8-azaguinine has the same effect on the oblique mitosis of the ceratodon protonema as on the biodimensional growth of the prothallus fern. This favors the hypothesis of an analogy between the two phenomena.

18308

Koncar-Djurdjevich, S. K.

INVESTIGATION OF ELECTROCHARGING DURING FLUIDIZATION AND EXPLANATION OF THE SHAPE OF SEPARATED MATERIALS. Documenta Chemica Yugoslavica, 28:513-522, 1963. 6 refs. Translated from Yugoslavian.

Solid particles in a fluidized bed receive an electrostatic charge as a result of friction with other particles and the walls of the bed. Both electric and hydrodynamic processes are involved in charging the particles, and many factors, such as the dielectric constant of the fluidized mass, have pronounced effects on the results. The polarity of the charged species in mono-and multi- dielectric systems and the characteristics of deposits of these species were studied. Moisture-free air was used to fluidize dried particles in a bed fitted with D. C. electrodes. The charge on the fluidized particles was determined by observing the polarity of the electrode on which the particles collected (e.g. positive particles are attracted to the negative electrode). During the fluidization of one-component systems, both positively and negatively charged particles were found. In two-component systems, the species with the higher dielectric constant was generally positively charged. This is in agreement with Koehn's Law. Sand, a constituent of all three-component systems examined, was always negatively charged, the other two holding a positive charge. On rod-shaped electrodes, particles would form a cluster at the lower, free end of the rod when the electrode was grounded to the metallic bed-supporting screen. When the electrode was insulated, two clusters were formed. One, the component usually attracted to that electrode, formed a band part way up the shaft. The other component formed the usual cluster on the end of the rod. Materials tested include KNO3, SiO3, NaCl, Mg CO3, Ca CO3, BaSO4, Pb(NO3)2, and coal.

19436

Angelillo, B.

MANGANESE IN DRINKING WATER. (Il Mn nelle acque destinate ad uso potabile). Igiene Mod. (Parma), vol. 54:3-34, Jan.-Feb. 1961. 72 refs. Translated from Italian. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 34p., Oct. 27, 1969.

Manganese in drinking water, it origin, the problems it causes, and its removal are discussed. Though manganese represents only 0.1% of the earth's crust, standing water (but not running water) has a tendency to concentrate it; concentrations in excess of 20 ppm have been obtained in some reservoirs. While manganese is essential to plants, it can do expensive damage in paper mills, wood pulping, and the manufacture of rayon and plastics. In the home, it can leave hard-to-remove stains on laundry and reduce or stop the flow of water by precipitating on the walls of pipes. The development of removal techniques is traced through the years and several of the more successful techniques that have evolved are presented. General categories of techniques discussed are mechanical, ion exchange, chemical, and catalytic, with combinations thereof representing the most common applications.

19890

Langemann, Horst

MASS- AND IMPULSE-BALANCE EQUATIONS OF ISOTHERMAL NONISOBARIC GAS-LIQUID PHASE-REACTORS. PART 1. (Massen- und Impulsbilanzgleichungen isothermer nichtisobarer Gas-Fluessigphase-Reaktoren I). Brenstoff-Chem. (Essen), 49(8): 238-241, Aug. 1968. 8 refs. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 17p., Nov. 12, 1969.

Proceeding from a one-dimensional kinetic model of an isothermal gas-liquid phase, counterflow reactor, the mass balances of the reaction components for the gas phase and the liquid phase, as well as continuity equations of both phases and the reaction space, are formulated. In addition, impulse balances of both phases and the reaction space are derived. The impulse-balance equation for reactor space and the continuity equations for gas and liquid phases are used to obtain differential equations for static pressure in a cross section of the reactor and the relative volume share of the gas phase. By deriving impulse-balances to the gravitational and compression force, the equations for the static pressure are simplified to an inhomogeneous, linear differential equation of the first order. By integration, static pressure as depending on the lenght of the reactor can be obtained. Moreover, the differential equations can be transformed into equations for determining the mean relative volume shares of the gas and the fluid phases in any given segment of the reactor. The relations set up for gas-liquid phase reactors can be modified, in the case of constant volume shares by introducing the mass density and the relative volume share of the mixture of liquid and solid to apply to gas-liquid phase reactors with a suspended solid content. (Author summary modified)

19967

Scholl, G.

A METHOD FOR A SEMIAUTOMATIC WATER SUPPLY FOR PLANT CULTURES IN EXPERIMENTAL VESSELS. (Ein Verfahren zur halbautomatischen Wasserversorgung von Pflanzenkulturen in Versuchsgefaben). Z. Pflanzenernaehrung, 124(2):126-129, 1969. 1 ref. Translated from German. Belov and Associates, Denver, Colo., 5p., May 15, 1970.

A device to automatically water plants in pot-type containers is described. Previous methods provided water on the basis of weight, but they are not practical for widespread experimental stations at external locations. The method described involves the use of ceramic cylinders to be used as suction fixtures operating in a negative pressure metering device. Pressure develops because of evaporation between the soil and the cylinder. At a proper hydrostatic connection between the supply container and the ceramic cylinder, water replenishment is automatic. Water has been supplied for as long as 14 trouble-free days by this method. (Author abstract modified)

21628

Scholz, F. O. and A. Berner

THE PREPARATION OF PARTICLES OF MAGNITUDE IN SIZE OF 10(-5) BY PHOTO CHEMICAL PROCESSES. Preprint, Vienna Univ., Austria, Physikalisches Inst., 14p., 1969. Translated from German. Belov and Associates, Denver, Colo., 4p., April 3, 1970.

Experiments are reported on the decompositions of hydrogen sulfite with ultraviolet radiation, to investigate photochemical methods of aerosol formation. Such methods have the advantage of permitting a constant reaction and nucleus formation in the entire reaction vessel, and sensitive control of the reaction through radiation dosage. The diluted and purified gas is passed into a ring-shaped radiation pipe. After radiation, the reaction mixture is thinned and transferred into an aerosol centrifuge for measuring the size distribution of the aerosol. This distribution depends upon the duration of radiation and the concentration of the gas. Magnification of the product from duration time and concentration results in a shift of the distribution function toward larger particles. A changing, intermittent radiation of the reaction mixture results in a monodispersed size distribution.

21701

Haenel, Gottfried

THE SIZE OF ATMOSPHERIC AEROSOL PARTICLES AS A FUNCTION OF THE RELATIVE HUMIDITY. (Die Groesse atmosphaerischer Aerosolteilchen als Funktion der relativen Luftfeuchtigkeit). Text in German. Beitr. Physik Atmosphere, vol. 43:119-132, 1970. 21 refs.

A model for the equivalent radius of atmospheric aerosols as a function of the relative humidity is developed. Equivalent radius is the radius of the sphere with the same volume as the particle. The model contains only parameters which can be directly determined by measurements on atmospheric aerosols. This makes the model applicable for the entire humidity range. Preliminary results of measurements on atmospheric aerosols at Mainz and on sea salts were used for calculations. Simplified but generally applicable equations were obtained in the range of less than 0.95 as well as for aerosols and sea salt particles with equivalent radii of larger than 0.4 micron in the dry state. These simplified equations can be used for calculating the refractive index and the light extinction of aerosol particles.

22219

Warburg, Otto and Walter Christian

CHEMICAL MECHANISM OF THE FLUORIDE-INHIBITION OF FERMENTATION. (Chemischer Mechanismus der Fluorid-Hemmung der Garung). Kurze Originalmitteilungen, vol. 39:194, 1941. Translated from German. Belov and Associates, Denver, Colo, 2p.

The chemical mechanism of inhibition of the ferment enolase by fluoride was investigated. Fluoride inhibition of three compounds was being determined: fluoride, magnesium salt, and phosphate. When the magnesium concentration was constant and the fluoride and phosphate varied, the equation phosphate times fluoride times remainder of effect/inhibition of effect equal constant was found. When the phosphate concentration was constant and the fluoride and magnesium salt varied, the equation magnesium salt times fluoride times remainder of effect/inhibition of effect equal constant was found. Since it is difficult to determine such a small phosphate concentration, the equation was not tested for large fluoride concentrations. However, both equations were tested and found to be valid for fluoride concentrations of 1/20,000 to 1/100. It was concluded that the effective compound for fluoride inhibition is a complex magnesium-fluoro-phosphate. This compound combines in proportion to its concentration with the ferment protein in a dissociating manner. The specific reversible inhibition is believed to be based on the displacement of the effective magnesium salt from the protein by the complex.

22319

Luther, H., G. Bergmann, H. D. Engelmann, and J. Zajontz

EXPERIMENTS FOR THE DETERMINATION OF REACTION KINETIC MAGNITUDE FOR THE ISOTHERMO PYROLYSIS OF BITUMINOUS COAL. PART II. DEVELOPMENT OF AN ANALOG COMPUTER PROGRAM AND COMPARISON OF RESULTS OBTAINED UNDER VARIOUS CONDITIONS. (Verscuche zur Bestimmung reaktionskinetischer Grossen bei der isothermen Steinkohlen-Pyrolyse). Chem. Ing. Tech., 41(3):743-790, July 1969. 7 refs. Translated from German. Belov and Associates, Denver, Colo., 22p., May 24, 1970.

An analog computer program was developed to determine first-order reaction kinetics involved in the isotherm pyrolysis of coal. The calculated constants of reaction speed can be assigned to reaction phases independent of the degree of carbonization. Activation energies of 48-66 kcal/mol and thrust factors of 10 to the 13th power to 10 to the 17th power reciprocal min were determined for methane, propane, ethylene, and carbon monoxide generated by the pyrolysis of bituminous coal. For ethane, these values lie between 50-90 kcal/mol and 10 to the 14th power to 10 to the 25th power reciprocal min. In a second analog computer program, kinetic reaction data obtained in the first program were used to establish degasing curves to be expected for a given speed of heating up under nonisothermal conditions. (Author introduction modified)

22402

Mueller, Peter

STUDY OF THE INFLUENCE OF SULFURIC ACID ON THE DEW POINT TEMPERATURE OF THE FLUE GAS. (Beitrag zur Frage des Einfluesses der Schwefelsaeure auf die Rauchgas-Taupunkttemperature). Chem. Ing. Tech., 31(5):345-350, 1959. 30 refs. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 20p., Oct. 21, 1969.

The dew points of flue gases with small sulfuric acid concentrations are determined with the aid of thermodynamic relationships. The theoretical values obtained are compared with previous measured results. The dew point characteristics of a mixture of H2SO4 and water vapor at lowest partial pressure ratios are discussed. The presence of other gases in a flue gas will have no effect on dewing as long as they do not react with H2SO4. The dew point characteristics given are valid only in those conditions were equilibrium conditions are reached. How this agrees with reality is a question of condensation kinetics. The dew point problem in the cylinders of internal combustion engines has become more critical due to changes in fuel characteristics and a demand for higher longevity of the engines. Rapidly changing thermodynamic parameters within the cylinder make the problem more complex.

22587

Luther, H., G. Bergmann, and T. N. Sreenivasan

EXPERIMENTS FOR THE DETERMINATION OF REACTION KINETIC MAGNITUDE FOR THE ISOTHERMAL PYROLYSIS OF BITUMINOUS COAL. (Versuche zur Bestimmung reaktionskinetischer Grossen bei der isothermen Steinkohlen-Pyrolysis). Chem. Fabrik, 40(7):317-364, April 10, 1968. 11 refs. Translated from German. Belov and Associates, Denver, Colo., 26p., May 22, 1970.

Formation of methane, ethane and hydrogen were observed volumetrically and by means of gas chromatography during isothermal pyrolyses of bituminous coal, vitrinite and exinite in a vacuum between 400 and 500 C. The constants of speed of reaction, activation energies (40 to 65 kcal/mol) and perturbation factors of the individual reaction stages were calculated from the values measured according to the method of the least square deviations. The gas formation curves which were measured non-isothermally were analyzed with the kinetic values found. A comparison with kinetic data found by various experimental methods showed essentially good agreement. While the formation curves for the total amount of gas, methane and hydrogen were quite similar to each other, the curve for the formation of ethane deviated noticeably. Values for methane and hydrogen which are approximately equal indicate that the formation of these gases takes place according to the same reaction mechanism, but the mechanism for ethane formation is yet to be investigated. The appendix describes the fitting of a curve on data points by linear or non-linear regression and iterative calculation by the method of steepest descent.

23638

Stuchtey, Karl

SPECTROANALYSIS OF THE RADIATION EMITTED DURING THE DECOMPOSITION OF OZONE. Z. Wiss Photor., Photophysik, Photochem., 19(7, 8):1-3 1920. 104 refs. Translated from German. 39p.

A spectrographic analysis of the luminescence observed during the decomposition of ozone is described. By heating ozone to about 400 C in a special furnace, a strong luminescence is induced. The emission spectrum is in the visible and ultraviolet regions, which coincides with known ozone data. Measurements of an ozonized mixture of oxygen and nitrogen are also studied. The mechanism of the observed luminescence is explained, and the concepts of processes occurring during ozone formation in glow discharge are verified. The nature of ozone luminescence is independent of the substances which are oxidized. Special spectrographic techniques and equipment are developed for the purposes of this investigation.

24490

Gutschick, D., J. Scheve, and G. Rienaecker

ON THE ROLE OF THE BONDING STRENGTH IN HETEROGENEOUS CATALYSIS. (Zur Rolle der Bindungsstarke in der heterogenen Katalyse). Z. Anorg. Allgem. Chem., 369(3-6):1969. 24 refs. Translated from German. Belov and Associates, Denver, Colo., 13p., Oct. 2, 1970.

Chemisorption as the initial step in the activation of gas molecule on solid interaction surfaces is the first step in the catalytic process. The strength of the bonding between the substratemolecule and the surface in chemisorption determines whether a catalytic process or binding between the substrate and solid body results. I oxidation reactions, it has been known since 1955 that optimal binding strength of the oxygen in oxides is the criteria for good catalytic activity. This optimum for the binding conditions of oxygen can be more closely characterized through conductivity measurements. Measurements are made for a series of reactions involving catalysts of alkali earth chromates. The results of the experiments are discussed in terms of activation energy, kinetics, and reaction mechanisms. (Author abstract modified)

28260

Kabanov, M. V.

ATTENTUATION OF LIGHT SIGNAL IN A SCATTERING MEDIUM. Sov. Phys. J. (English translation from Russian of: Izv. Vyssh. Ucheb. Zaved. Fiz.), 9(5):11-13, Sept.-Oct. 1966. 7 refs.

A quantitative assessement of effects due to the interference on waves scattered by an ensemble of particles is given. It is shown that in the propagation of a collimated beam of light in a turbid medium, interference effects give rise to an addition stretching of the scattering indicatrix for a single particle. The interference 'tongue' obtained is concentrated in a very small angle in the direction of the light beam incident on the particle system. Over a wide range of experimental conditions, this angle is of the order of a few minutes. (Author abstract)

28263

Filippov, A. P. and G. I. Krutova

INTERACTION OF OXIDES OF NITROGEN WITH COMPONENTS OF THE EXTRACTION REAGENT--DILUENT SYSTEM. Radiochemistry (USSR) (English translation from Russian of: Radiokhimiya), 11(5):527-531 Sept.-Oct. 1969. 18 refs.

The interaction of nitrogen oxides with n-octane, sulfurated kerosene, and carbon tetrachloride was investigated by infrared spectrometry. When an equimolar mixture of nitric oxide and nitrogen dioxide was contacted with saturated hydrocarbons, NO2 dissolved, then interacted with the hydrocarbons to form nitroparaffins, nitric esters, and probably nitrous acid. Dissolution of NO and NO2 without chemical interaction was observed in carbon tetrachloride. When nitrogen oxides were brought into contact with tributyl phosphate and Di-2-ethylhexylphosphoric acid in the presence of negligible amounts of water, molecular nitric acid and apparently, nitrous acid were formed. These interacted with the extraction agents, forming complexes. No destructive changes in the extraction reagents occurred under the influence of the nitrogen oxides. (Author conclusions modified)

28678

Suzuki, H.

ON THE DEHYDRATION REACTION OF PYROLOTITE BY SULFUR DIOXIDE. Nippon Kogyo Butsurikagaku Kenkyu (Tokyo) (Japan. Ind. Phys. Chem. Res.), no. 22:293-297, 1969 (?). Translated from Japanese, Belov and Associates, Denver, Colo., 8p., April 30, 1970.

A method of obtaining sulfur and iron by the desulfurization reaction of pyrolotite FeS was studied. The sulfur was estimated by the iodine method and iron by the standard potassium permanganate method. The sample consisted of 83.2% FeS. An electric furnace was used to heat a quartz reaction tube to a preassigned temperature and air was exhausted from the system by nitrogen. The sample was broken into small pieces and inserted in the quartz reaction tube. The nitrogen was switched to sulfur dioxide at a constant speed. After a given amount of reaction time the SO2 is again switched to nitrogen, the temperature of the electric furnace was lowered, the sample removed, and the reaction rate was calculated by estimating the leftover sulfur. Equations are given for the calculation of the thermodynamic analysis of the reaction. To find the best conditions for the reaction, a constant-size sample, 0.5 g, was used and the reaction time set for 1 hour. By changing the temperature and the flow velocity of SO2, the reaction time could be studied. When a temperature higher than 900 C is used with the appropriate flow velocity of SO2 (40-60 cc) the reaction takes place almost perfectly in 90 to 120 minutes.

30042

Shandorov, G. S.

CALCULATION OF A JET AXIS IN A DRIFTING FLOW. (Raschet osi strui v snosyashchem potoke). Izv. Vyssh. Ucheb. Zaved. Aviat. Tekh., 9(2):100-104, 1966. 3 refs. Translated from Russian. Holman (John F.) and Co., Inc. 6p., Dec. 1966. NTIS: NASA TT F-10,638

Gas jet forms can be theoretrically determined. Various forces deflect the jet including pressure. The pressure distribution around the jet, the variation in the maximum dimensionless rarefaction at the initial cross section, and the axes of the jets can be determined.

30737

Hugel, Marie-France

A STUDY OF SOME COMPONENTS OF POLLEN. (Etude de quelques constituants du pollen). Ann. de l Abeille, 5(2):97-133, 1962. 65 refs. Translated from French. Dept. of Agriculture, Beltsville, Md., Bee Culture Library, 27p., April 1964.

Research being conducted on the chemistry of pollen was reviewed. The principal results obtained from the pine tree pollen which causes sarcoidosis were reported. Various samples of pollen, collected by bees, such as mixed pollen, apple pollen, and rockrose pollen were examined. The substances attractive to the bees as well as substances that can be obtained in the pure state were identified. The substance 24-methylene-cholesterol was isolated from two pure pollens and one mixed pollen. It was previously shown that insects cannot synthesize sterols. Hence, the 24-methylene-cholesterol isolated from bees could come either from the food or a transformation of a phytosterol. Having isolated 24-methylene-cholesterol in a considerable quantity from different pollens shows the purely food origin of this sterol.

31039

Scholz, F. O. and A. Berner

THE PRODUCTION OF PARTICLES OF THE ORDER OF MAGNITUDE 0.00001 CM BY PHOTO-CHEMICAL PROCESSES. Preprint, Vienna Univ. (Austria), Physikalisches Inst., 13p., 1969 (?). Translated from German. Belov and Associates, Denver, Colo., 13p., Dec. 15, 1970.

Relatively stable aerosols were produced by decomposing hydrogen sulfide under ultraviolet radiation into hydrogen and sulfur. The production involved passing a mixture of H2S and nitrogen through a microsorban filter to an illumination pipe where the gas mixture was exposed to the unfiltered light of a 200 mercury steam lamp located in the center of the pipe. The reaction mixture was then thinned with filtered nitrogen and conducted to an aerosol centrifuge with which the power distribution of the aerosol was measured. Particle size distribution was found to be influenced by the H2S concentration and length of stay of the gas mixture in the illumination pipe and even more so by intermittent illumination of the reaction mixture. The latter produced monodisperse aerosols with a narrow size distribution as the result of homogeneous condensation.

31415

Feifel, E.

DUST AS A CHARGE CARRIER; CONCEPTS OF DUST TECHNOLOGY, IV. (Staub als Ladungstrager; Begriffe der Staubtechnik IV). Radex Rundschau (Austria), no. 2:904-917, 1957. 9 refs. Translated from German. Leo Kanner Assoc., Redwood City, Calif., 32p., May 1971.

Finely distributed admixtures to a flow of gas, which bounce against, glide along, or are torn away from the delimitation of a flow, are electrically charged. Besides the static electric properties of the two bodies in contact, the contents of dust of the gas principally determine the intensity of the charge of all particles. The influence of the size of grain on the electric capacity of dust is examined, and results are obtained from an electrostatic measurement of the dust contents. Exhaustive measurements were taken on various types of dust; results obtained from quick ash are used as a sample for the method of calculation and the accuracy of the measurement. The chargeability of single particles, boundary charge and particle number of a dust cloud, and measurement of charging are examined. Variations of the granulation unquestionably influenced the total charge. As long as they stayed within the customary practical limits, the indications of the measuring device also remained within the permissible limits of tolerances for measuring dust.

36086

Undintseva, V. S. and G. I. Chufarov

KINETICS OF THE REACTION BETWEEN SO2 AND H2S. Khim. Prom. (Moscow), 17(3):24-28, 1940. 5 refs. Translated from Russian. Central Electricity Generating Board, London (England), Information Service, 12p.

The kinetics of the reaction between sulfur dioxide and hydrogen sulfide within the range 250-350 C, occurring in the contact apparatus of sulfuric acid plants and the effect of reaction vessel surface and type of wall surface on the reaction rate were studied. The reaction proceeds exclusively on the walls of the reaction vessel. Within the pressure and temperature range studied, the reaction rate in a glass vessel is directly proportional to the sum of the partial pressures of an equivalent mixture of the reagent gases. The ratio of the quantities of H2S and SO2, reacted in a unit of time and was equal to the ratio of the surfaces of the vessels in vessels of different dimensions. The reaction was sensitive to the state of the reaction vessel surface and the reaction rate varied widely in response to changes in the state of the surface. The covering of the surface of the glass reaction vessel with metal films of iron, copper, and aluminum and the exposure of films of these materials to H2S and SO2 mixtures, showed that in all cases the reaction is retarded by comparison with glass surfaces. However, with a film containing aluminum, the reaction proceeds more rapidly than with all the other films and approximates the rate on a pure glass surface.

36320

Sutugin, A. G.

COAGULATION CONSTANTS OF AEROSOLS AT KNUDSEN NUMBERS OF THE ORDER OF 1.0. Colloid J. (USSR) (English translation from Russian of: Kolloidn. Zh.), 29(6):633-634, Nov.-Dec. 1967. 5 refs.

A flow method was used to determine the coagulation constant of uncharged dioctyl sebacate aerosol with an average particle radius of 100 A (Knudsen aerosol number approximately 2). The average value of the constant was 13.4-10 to the minus 10th power cu cm/sec This result is in satisfactory agreement with the Fuks equation for the coagulation constant in the intermediate range. The role of molecular forces in coagulation of dioctyl sebacate aerosol with an average particle radius of 100 A is not large. (Author conclusions)

37582

Ustinov, V. I. and V. A. Grinenko

THE ISOTOPE EFFECT IN THE ELECTRON BOMBARDMENT OF SULPHUR DIOXIDE MOLECULES. Russ. J. Phys. Chem. (English translation from Russia of: Zh. Fiz. Khim.), 45(7):935-937, July 1971. 12 refs.

The fractionation of oxygen isotopes in the dissociation of sulfur dioxide by electron impact was studied with a mass spectrometer modified for precision isotope analysis. An isotope separation factor of 1.046 was calculated from the ratios of ionic current with M/e equal to 48, 50, 64, and 66 for SO2 with natural isotope content SO2 enriched with 02(18). The experimental separation value was in satisfactory agreement with theoretical separation factors calculated by the Franck-Condon and Bigeleisen methods. The separation data imply that, on dissociation of SO2 by electron impact, the S-O bonds are not distorted in the resulting transition complex. This is consistent with the hypothesis that the energy of the bombarding electron is not distributed among all the bonds and leads solely to the dissociation of an individual bond.

G. EFFECTS-HUMAN HEALTH

02539

(INHALED NOXIOUS POLLUTANTS.) Pollutants nocifs inhales. (Part of Chapter 1: Les pollutions et 'nuisances d'origine industrielle et urbaine. Tome 1. Leur prevention et les problemes scientifiques et techniques qu'elle pose en France.) Premier Ministre, Delegation generale a la recherche scientifique et technique. 13-7, June 1966.

This information on inhaled noxious pollutants, which is presented in brief semi-outline form, deals with: chronic and acute effects, influence of dusts on the lungs, influence of non-carcinogenic pollutants, influence of bacteria and viruses, and principal areas of concern in research. Pollutants must be considered both for their independent effect and for that which is conditioned by the state of health of the person such as that of persons with cardiovascular impairment or chronic bronchitis. Reactions from a number of pollutants, including ozone, nitrous vapors, and carbon monoxide, are of great concern. Research studies are being pursued with synthetic atmospheres in relation to synergistic actions; with studies of the atmosphere in certain areas of Paris during a normal period and during a period of smog; with toxicological studies of certain chemical agents, particularly sulfur dioxide, carbon monoxide, and various fluorine compounds, with a view of fixing their limits of tolerance; with the carcinogenic potential of chemical agents as pollutants; and with consideration of the respiratory tree as influenced by inhaled chemical agents and studies of respiratory insufficiencies. This information is given in a section of Chapter 1 of this monograph.

03202

V. Del Vecchio.

THE PROBLEMS OF BASIC URBAN AIR POLLUTION. Il problema dell'inquinamento di fondo urbano dell'aria atmosferica. Fumi Polveri (Milan) 6, (6) 177-8, June 1966.

Basic urban air pollution refers to the discharge into the air of exhaust gases from motor vehicles and from heating units, which are prevalently inefficient. Both sources discharge respirable dusts and gases, the latter including some aliphatic and aromatic hydrocarbons which have proven carcinogenic in experimental animals. The problem arising from the incomplete combustion of motor fuels is aggravated by the presence, in Italian cities, of narrow streets and relatively high buildings which become repositories of emitted fumes and dust from slow-moving vehicles. As much as 12 to 13% CO may be present in gasoline-driven motor car exhaust. While gross measurement of pollutants present in the urban air is of high indicative value, public health aspects of the problem demand that granulometric studies of the dust particles also be conducted, since size is a factor in respirability. In addition, photochemical studies involving the interaction between the pollutants in the air and the sun's rays indicate that solar radiation transforms the originally present contaminants into biologically more receptive compounds, quite different from their precursors. Thus peroxacetylnitrate(PAN) is produced from NOx, and the new substance is a powerful irritant of the mucus membranes. The dramatic episodes of mass illness resulting from smog in various places in recent years were caused by the phenomenon of thermal inversion which prevented the dispersion of the irritants present in the air.

03214

REPORT ON THE RESULTS OF INVESTIGATION OF THE EFFECTS OF AUTOMOBILE EXHAUST ON THE HUMAN BODY. Kuki Seijo (Clean Air -J. Japan Air Cleaning Assoc., Tokyo) 4(1):39-43, 1966.

The measurement of CO, soot, nitrogen oxides, SO2, SO3, and hydrocarbons and their medical psychological effects on the human body were investigated in September, 1965 in two regions with contrasting amounts of daily traffic. A quiet region to be considered was the vicinity of Ohara-Machi Setagagya-ku, Tokyo and the other was in the vicinity of National Hygienic Laboratory at Yoga-cho Setagaya-ka, Tokyo. The results are stated categorically for each air pollutant. To determine environ- mental effects meteorological data were supplied by Tokyo Dis- trict Central Meteorological Observatory.

06866

O. G. Arkhipova, M. S. Tolgskaya, T. A. Kochetkova

TOXICITY WITHIN A FACTORY OF THE VAPOR OF NEW ANTIKNOCK COMPOUND, MANGANESE CYCLOPENTADIENYLTRICARBONYL. (K voprosu o toksichnosti parov novogo antidetonatora tsiklopendadieniltrikarbonila margantsa (v vozukhe priozvodstvennykh pomeshchenii). Hyg. Sanit. (Gigiena i Sanit.) 30 (4), 40-4 (Apr. 1965). Russ. (Tr.)

Manganese cyclopentadienyltricarbonyl (MTC) is toxigenic in small concentrations and has pronounced cumulative properties. A single exposure to MCT vapors in 0.1 mg/l concentrations in the air is dangerous for life. In concentrations of 0.01 mg/l in the air this substance may cause serious and lethal poisoning in cases of multiple exposures. Concentrations at a level of 0.001 mg/l produce functional shifts in the nervous system and initial morphological lesions in the respiratory tract. The new antidetonator is endowed with a weak irrigating effect at rhe site of contact; when dissolved in oil and benzene it does not penetrate the skin. The solvent tetrahydrofuran, which is used in the production of MCT in tetrahydrofuran penetrates intact skin and causes intoxication.

07015

Collet, A., J. C. Martin, C. Normand-Reuet, and A. Policard

INFRASTRUCTURAL INVESTIGATIONS OF THE DEVELOPMENT OF ALVEOLAR MACROPHAGES AND THEIR REACTIONS TO MINERAL DUSTS. ((Recherches infrastructurales sur l'evolution des macrophages alveolaires et leurs reactions aux poussiers minerales)). Proc. Intern. Symp. Inhaled Particles Vapours, II, Cambridge, England, 1965. p. 155-163, 1967. Translated from French.

The electron microscopic examination of normal alveolar macrophages, harvested by washing out the lungs, reveals common features which are those of histiocytic cells, differing from other pulmonary parietal lining cells, and features peculiar to the species investigated (cat, rabbit, guinea pig, man), concerning the lysosomic cytoplasmic inclusions. The investigation of a great number of cells shows the possible evolution from a small non-phagocytic lymphocyte-shaped cell, identical in all species, to the well-known large alveolar macrophage. As a rule phagocytosis is related to lysosomic structures and clears most of them away from the cytoplasm. The particles are usually surrounded by a cytomembrane. Few cytological alterations after phagocytosis are observed. The presence of ingested particles causes iron to accumulate. AS

07173

D. Henschler, E. Hahn, and W. Assmann.

CONDITIONS FOR AN INCREASE IN TOLERANCE UPON REPEATED INHALATION OF IRRITATING GASES WHICH CAUSE PULMONARY EDEMA. ((Wirkungsbedingungen einer Toleranzsteigerung bei wiederholter Einatmung von Lungenodem erzeugenden Reizgasen.)) Arch. Exptl. Pathol. Pharmakol. Vol. 249:325-342 (Nov. 6, 1964). Ger.

Opinions are divergent concerning the effect of long-term inhalation of low concentrations of gases and aerosols which can cause pulmonary edema. This paper investigates the time relationships in the formation of increased tolerance to such gases, its duration, the influence of time and concentration, and the pathological-anatomical reaction of lung tissue to the preliminary treatment. After the protective mechanism was proved to be independent of the chemical structure of the irritant, NO2 was chosed as representative of the gases causing pulmonary edema. Most of the laboratory animals used were inbred mice of the CFW and NMRI families (Zentral-institut fur Versuchstierzucht, Hannover), which were brought into the test weighing 18-22 gm. Increased tolerance to high concentrations of NO2 was obtained by exposing the specimens to 40 ppm NO2 for one 6-hr period. The protection reaction first appears within 24 hr. Maximum protection occurs in 2-5 days and is largely gone after 10 days. Repeated preliminary exposure with the same concentrations at 4-day intervals does not increase the amount or duration of protection.

07174

H. W. Schlipkoter and A. Brockhaus

TESTS ON THE EFFECT OF GASEOUS AIR POLLUTION ON THE DEPOSITION AND ELIMINATION OF INHALED DUSTS. ((Versuche uber den Einfluss gasformiger Luftverunreinigungen auf die Deposition und Elimination inhalierter Staube.)) ZBL Bakt. 191(12):339-344 Dec. 1963. Ger.

To be injurious to men, suspended particles in the atmosphere must be inhaled and deposited in the lungs. Only particles smaller than 5 microns and especially smaller than 1 micron can penetrate into deep sections of the lungs. Other important factors are the type and dissolvability of the dust as well as the volume and frequency of respiration. To determine the deposition of dust in lungs, it is necessary to determine the difference between the dust content of inhaled and exhaled air. A test conducted to determine the effect of gases found in large cities on the amount of dust deposited in lungs utilized a mixture of 2 types of soot with air which was sprayed and measured with a special apparatus. Spectrophotometric and quantitative methods were used to determine the amount of dust deposited in the lungs of test persons who respired at a rate of 1% breaths per minute, temperature of 23 deg. C, and a humidity of about 68%. Typical gases mixed with the test suspension in the dust chamber were SO2 and CO2 or NO2 in concentrations which correspond to the MAK values. An increase in dust deposition in the lungs was observed only when nitrogen gases were inhaled simultaneously. Further tests showed that the elimination of deposited dust from the lungs is hindered by SO2 and SO3.

07189

Ch. Gernez-Rieux, C. Voisin, J. Guillaume, F. Wattel, and C. Aerts

INVESTIGATION OF THE ROLE OF THE ALVEOLAR MACROPHAGE IN RESPIRATORY PHYSIOLOGICAL PATHOLOGY. Recherches sur le role du Macrophage Alveolaire en Physiopathologie Respiratoire. Lille Med. (France) 12(2), 149-158 Feb. 1967.

The action of influenza virus and various mineral dusts on the activity of alveolar macrophages extracted from guinea pigs is described. The alveolar macrophages extracted from the lungs of sacrificed guinea pigs were centrifuged and preserved until ready for experimental use. The cell behavior was observed with the electron microscope and by microcinematography. The cellular activity is followed by the phagocytic and metabolic activity. The cytotoxic effect of influenza virus on the macrophages was followed by the oxygen consumption and carbon dioxide evolved. With carbon dust there was no change in cell vitality or metabolic activity. With silica dust there was a cytotoxic effect, but with the addition of polyvinylpyridine-N-oxide there was a protective action and the microcinematographic pictures were normal.

07379

R. Kano

OZONE. Text in Japanese. Kuki Seijo (Clean Air-J. Japan Air Cleaning Assoc.) 2(1):54-59, 1964. 11 refs.

The methods of production, toxic nature, and methods of detection of ozone are described. The Denshi Ozonizer No. 1 is illustrated in which oxygen or air is passed between the dielectric plates and a silent discharge by high voltage a.c. produces ozone. The ozone concentration varies according to humidity and temperature of the air, low temperature and humidity being favorable for effective utilization of the ozone. Part of the toxic character of ozone comes from the presence of nitrogen oxide as an impurity. The maximum allowable concentration of each in its pure state is 20 ppm but when mixed, 1 ppm is the maximum. Uses of ozone for air cleaning, oxidation of organic compounds, sterilization, water cleaning, deodorization, etc. are covered. Ozone detection methods are divided into chemical and physical methods. The physical method is more convenient and fast. Usually the odor of ozone permits its detection before much harm to the human body can occur.

07541

P. Polu, P. Laurent, C. H. Guyotjeannin, D. Thin

AN OCCUPATIONAL DISEASE OF CHIMNEY SWEEPS CLEANING OIL-FIRED FURNACES. (Pathologie professionnelle des fumistes effectuant le ramonage des chaufferies a mazout.) Text in French. Arch. Maladies Profess. Med. Trav. Securite Social (Paris), 26(4-5):435-446, April-May 1967. 8 refs.

The frequent and consistent symptoms experienced by chimney sweeps cleaning oil-fired furnaces appear to present a new specific syndrome. Most of the efforts of industrial hygienists have been concentrated on the pollution in the air and not much has been done on the chemistry of soots. Findings, hypotheses as well as suggestions for control are presented. A table is given which compares the symptoms of the workers such as irritation of the eyes, the upper respiratory tract, the mouth, and skin as well as serious deterioration of their clothing. The men also complained of loss of appetite, nausea, vomiting, lack of coordination of movements, amnesia, and headache. In the same table in parallel columns are listed the symptoms of exposure to vanadium, sulfur dioxide, and oxides of nitrogen. Based on an examination of the soot involved it was concluded that the vanadium was not involved in the symptoms of the chimney sweeps and that the sulfur content of the fuel was an important factor. It is recommended that fuels low in sulfur be used, that the optimum combustion conditions be maintained by keeping the temperature of the flame down by a high excess of outside air. Electrostatic precipitators can cut the emission of SO_3 by 50%. The injection of magnesia in the vicinity of the flame can meutralize the SO_3he use of industrial-type vacuum cleaners offers a method of furnace cleaning without an occupational exposure.

07592

Horai, Z., M. Yokoi, I. Nakamura, M. Shibata, and T. Sano

PATHOLOGICAL STUDIES ON THE LUNG RESULTING FROM AIR POLLUTION. J. Nara Med. Assoc., 18(1):1-5, Jan. 1967. 3 refs.

Lung tissue has been examined from victims of fatal accidents in Osaka, Japan to determine the location, amount, and chemical composition of black-dust deposits due to air pollution. The nature of pulmonary lesions was also studied. Information is given on the preparation of the specimens for microscopic and chemical analysis. Tabulated data give comparative information on (1) the amount of black dust deposits in people over the age of 40, (2) the relationship between connective tissue development and the amount of black dust deposits, (3) the number of dust foci over 1 mm in size and the occurrence of bullous emphysema, (4) the weight of dust and the percentage of silica in the lungs of persons 46, 58, and 63 years old, and (5) the weight of the various chemical elements in persons over 58 yr. Large deposits of black dust were frequently observed in persons over 60. Perivascular proliferation of connective tissue increased with an increase of black dust deposits. In macro-specimens, nodular foci per unit area increased with increasing age. This suggests that intrapulmonary black dust depsotion due to air pollution increases with age. Further studies are recommended.

08305

Kagawa, Jun

THE USEFULNESS OF THE METHOD OF SINE WAVE OSCILLATING PRESSURE FOR MEASURING TOTAL RESPIRATORY FLOW RESISTANCE IN HUMAN SUBJECTS AND GUINEA PIGS. Text in Japanese. Japan. J. Hyg. (Tokyo), 21(6):424 436, Feb. 1967. 18 refs.

The validity and applicability of a sine wave oscillation method for measuring total respiratory flow resistance in man and guinea pigs were investigated. Diagrams giving exact measurements of the body plethysmographs and the pressure imposing device used in the experiments are provided. The frequency of the sine wave oscillation with which the activity of the chest-lung system becomes zero, was found to be 7 approximately 9 c.p.s. in both man and guinea pig. Over 12 c.p.s. the impedance of the system showed a steep rise. By analyzing the flow and its imposed pressure curves, it was found that the total respiratory flow resistance showed continuous change according to the different stages of the flow curve. By the use of an artificial mouthpiece resistor having three kinds of known resistance in man, the frequencies 7 approximately 9 c.p.s. also showed the most pertinent reproducibility, and the impendance was overestimated by frequencies below or above this range. When this technique was applied to the short term inhalation study of low concentraion of SO_2 (1.5-2.0 ppm) in man, it revealed rapid response and individual difference of the sensitivity of the total respiratory flow resistance after a few seconds of the exposure. In long term exposure of guinea pigs to 0.1 ppm of toluene diisocyanate vapor without any surgical treatment, the animals showed a repeated day to day response with different individual sensitivity, and when sodium chloride aerosols were added the response of the total respiratory flow resistance was affected in a meaningful pattern. The results, which are illustrated in graphs and tables, show this procedure to be a relevant and sensitive method to evaluate the behavior of the respiratory air way in both man and guinea pig in short or long term studies of environmental toxic materials.

08461

Il'nitskaya, A. V.

PROBLEMS OF OCCUPATIONAL HYGIENE AND HEALTH MEASURES IN PLASMA SPRAY-COATING OF METALS. ((Voprosy gigieny truda i ozdorovitelnye meropriyatiya pri plazmennom napylenii metallov.)) Text in Russian. Gigiena Truda i Prof. Zabolevaniya (Moscow), 10(7):21-27, July 1966. 7 refs.

Plasma spray coating of metals is accompanied by health hazards, such as high-frequency noise, the presence of aerosols, nitrous oxide, and ozone, as well as the ionization of air and ultraviolet radiation. The aerodynamic noise levels may attain 128-130 db. A special polyclinical and physiological examination of workers showed disturbed vascular tone with a tendency towards hypotension, slowed-down pulse and abnormal cardiac rhythm, as well as an increased threshold of auditory sensitivity by the end of the work day. Workers with a service record of 2-5 years exhibited impaired hearing with distorted perception of high-pitched tones. Recommendations are made for reducing the health hazards of operators. (Author's summary, modified)

08611

Bankl, H. and K. Jellinger

CENTRAL NERVOUS SYSTEM DAMAGE AFTER FETAL CARBON MONOXIDE POISONING. ((Zentralnervoee Schaden nach fetaler Kohlenoxyd- vergiftung.)) Text in German. Beitr. Pathol. Anat. (Jena), Vol. 135, p. 350-376, 1967. ((83)) refs.

After a short review of the effects of carbon monoxide ihtoxica- tion on the fetus, including a table detailing autopsy findings in nine cases, a report is given on a case of fetal CO poisoning due to a gas accident suffered by a 23-year-old mother in the 24th week of her pregnancy. She was unconscious for 3102 hours. Six weeks later the child was born spontaneously. It breathed spontaneously, but died 1 1/2 hours later. Postmorten examination revealed severe damage, almost ubiquitous in distribution, to the gray matter, manifesting itself in widespread necroses of the cerebral cortex, the nuclei of the brainstem, the midbrain nuclei, the pontine peduncular and the tegmental neclei. The extent of the necrotic involvement of the cerebral white matter and the spinal cord is discussed. The cerebellar cortex, as well as inferior olivary bodies were relatively unaffected.

08801

Hogger, Dieter

EFFECTS OF THE MOTOR VEHICLE EXHAUST GASES ON HUMANS, ANIMALS AND PLANTS. ((Auswirkungen der Motorfahrzeugabgase auf Menschen, Tiere und Pflanzen.)) Text in German. Z. Praeventivmed., Vol. 11, p. 161-178, March-April, 1966. 20 refs.

The various toxic components in automobile exhaust gases are reviewed. To determine the amount of carbon monoxide inhaled by the population, the carbon monoxide hemoglobin content of 331 policemen and 597 automobile drivers was determined during a test for alcohol. The nonsmoking policemen did not exceed the 5% limit, but 25% of smoking policemen and 40% of the drivers did. The amount of lead in the street, in windowsill dust, and in the street air was well as in the blood of office workers, metal work- ers and garage workers was determined in Zurich between 1948-1963. While the amount of lead in the dust of the street, air, and win- dow sills increased significantly by 1955, the amount found in the blood increased only slightly. Soot is considered deleterious as a carrier of other water soluble toxic substances into the lungs. The hygienic limit of 0.5 cc./cu m for oxides of nitrogen is only seldom exceeded. Sulfur dioxide emissions are negligible. Hydrocarbons and polycyclic hydrocarbon emissions from motor vehicles contribute only a few percent to the rise in lung cancer. The paraffin and olefin hydrocarbons are nontoxic to humans, animals and plants, while ethylene is highly toxic to plants. While in Europe oxidants do not contribute significantly to air pollution, compounds such as ozone and peroxyacylnitrite contribute to air pollution in tropic and subtropic climates with a high concentration of motor vehicle traffic, particularly under adverse meteorological conditions. The psychological problems caused by air pollution are discussed and it is concluded that the psychological effects cannot be dismissed lightly.

08949

Grigor'ev, Z. E.

THE CONSEQUENCES OF CHRONIC LEAD POISONING. (0 posledestviyakh Kdhronicheskoi svintsovoi intoksikatsii.) Text in Russian. Vrachebnoe Delo, No. 11, p. 117-118, Nov. 1967.

Workers in various professions exposed to lead vapors or dust in concentrations exceeding 0.01 mg/cubic meter were examined and working capability was evaluated on the basis of clinical symptoms and general condition. In earlier stages of poisoning, temporary transfer to working places without exposure to lead is recommended. Where the symptoms do not disappear, then permanent retirement must be recommended. The average exposure time before retirenent due to chronic poisoning was 11.6 years for men and 12 years for women. Retirement of women is less frequent than for men, which is attributed to the less hazardous conditions for women.

09232

Rogala, H. and Malinowski, E.

A CASE OF NITROGEN OXIDE POISONING. ((Przypadek zatrucia tlen- kami azotu.)) Text in Polish. Polish Tygod. Lekar. Wiadomosci Lekar. 23(1):18-19, Jan. 1968. 9 refs.

NO2 poisoning in a 34-yr.-old engineer is described. He was exposed for 30 min. to the yellow fumes generated in the fire of an ammonium nitrate storage facility. After treatment for a leg injury, he was returned home. Some 12 hrs. later he was delivered unconscious to the hospital, where he developed acute pulmonary edema. Symptoms and treatment are detailed. Recovery was comp- lete and within one month. The need to organize a toxicological information center is emphasized in order to secure prompt treat- ment for similar cases. Rogala, Henryk and Edward Malinowski

09535

Teisinger, J.

RELATIONSHIP BETWEEN LEAD LEVEL IN BLOOD AND IN URINE IN PERSONS NOT EXPOSED TO LEAD. ((Vztah mezi hladinou olova v krvi a v moci u lidi olovu neexponovanych.)) Text in Czech. Casopsis Lekaru Ceskych (Prague), 105(30):810-812, July 5, 1966. 5refs.

Lead levels are tabulated for 789 urine and blood samples obtained from persons in 16 countries and major cities who had not been occupationally or otherwise exposed to lead. Lead levels in blood and urine ranged from 7-26microgram% in blood and 22-46 microgram/l in urine. Analysis of the data showed that the lead concentration in the blood is directly proportional to that in urine. An in- crease in the blood level of 1 microgram % is accompanied by an increase in the urine level of 1.4 microgram/l. A plot of lead concentration in the blood vs. that in the urine gives a straight line which intersects the urine concentration ordinate at a value of about 12 microgram/l. Since this is impossible it appears that the correlation line must be curved in the lower concentra- tion range. The proportionality between the lead concentration in the urine and in the blood is considered as indirect evidence that lead at normal blood levels is excreted by glomerular filtra- tion only.

09725

Steiger, H., and A. Brockhaus

INVESTIGATIONS OF THE RELATIONSHIP BETWEEN AIR POLLUTION AND THE DEATH RATE IN THE RUHR DISTRICT. ((Untersuchungen ueber den Zusammenhang zwischen Luftverunreinigung en und Mortalitat im Ruhrgebiet.)) Text in German. Naturwissenschaften (Berlin), 53(19):498. Oct. 1966. 5 refs.

The death rate in a dozen Ruhr towns and cities following the temperature inversion of 3-7 December 1962 is studied in order to establish a relationship between the death rate and the high dust concentrations in the air (2.4-5.0 mg./m.3). While the death rate increased by 29% over the period 3-17 December 1962, the absence of regular concentration measurements made any correlation imposs- ble.

09934

Boqusz, Waldemar, Brygida Koehler, Janina Rzepkowa and Jerry Rzepka

EFFECT OF AIR POLLUTION IN THE GOP (UPPER SILESIAN INDUSTRIAL DISTRICT) ON THE UPPER RESPIRATORY TRACT OF A SELECTED GROUP OF SCHOOL CHILDREN. ((Wplyw zenieczyszczen powietrza atmosferycznego GOP na gorne drogi oddechowe wybrane grupy mlodziezy szkolnej.)) Text in Polish. Otolaryngol. Polska (Warsaw), 21(6):801-803, 1967.

Air pollution in Poland causes economic losses estimated at 8 million zloty annually and, in addition, it exerts a noxious influence on human health. This condition is acute in Katowice province, where 23 percent of the Polish labor force is employed on 3 percent of the land, and particularly affects the GOP, an area of 2,000 sq. km with 2,800 people per sq. km. Some 733 school children from the area of Chorzow, in the center of the GOP, were studied over a 7-year period (1959-1966). The most common respiratory illness was rhinitis (31 percent of Group A, from Corzow Stary, and 26 percent in Group B, from Katowice-Ochojec). Tonsillitis was reported in 9.2 percent of Group A and 19 percent in Group B, and allergic rhinitis in 58 percent and 8 percent respectively. It is evident that air pollution has an effect on the incidence of ordinary and allergic rhinitis. The inverse relationship of tonsillitis to air pollution leads to the supposition that some fractions in the polluting emissions may stimulate the lymphatic system. The highest pollution was reported from the area of a nitrogen plant, with an average dust fall of 602.28 g/ sq m/ month and a daily average of SO2 concentration of 2.24 mg/100 sq cm PbO2. Chemical analysis of the dust revealed 74 percent inorganic, 25 percent organic and 0.5 percent tarry substances. Data from low pollution points in the Katowice-Ochojec suburban area showed an average dust fall of 23.03 g/sq m/month and a daily average SO2 concentration of 0.91 mg/100 sq cm PbO2.

10321

Kodama, Buichi, Setsvo Masuda, Mitsuru Nishikawa, Masato Hyashi, Iakezo Hattori and Makoto Ishida

THE INFLUENCE OF AIR POLLUTION IN YOKKAICHI CITY OF THE VENTILATORY FUNCTION OF SCHOOL CHILDREN. Text in Japanese. Nippon Shonika Gakukai Zasshi. (Acta Pediat. Japon.) (Tokyo), 70(12):1299-13-7, 1966. 41 refs.

Ventilation function studies with school children were conducted over a 15-month period in order to investigate the effect of air pollution due to petroleum industry installations built since 1955 in Yokkaichi, Japan. Wright peak flow meter measurements for children aged 6-12, and Vitalor MMF (peak flow rate) measurements for children aged 10-12, were carried out, using about 1,080 children from a polluted area and about 290 from a non-polluted area. In addition, FRC, FVC, FEV0.5, and FEB1.0 were investigated. Chronic reduction of ventilation function is noticed in school children aged 6-12 from the polluted area. The difference between polluted area residents decreases with age. This is especially noticeable for girls. Disturbance of ventilation function generally appears as obstructive difficulties rather than restrictive difficulties because of the apparent reduction in FRC, MMF50-75%, FEV1.0 and FEV0.5, and also a slight reduction in FVC. The differences between polluted and non-polluted areas were found to be more noticeable in winter than in summer. Ventilatory disturbances in polluted area school children may be enhanced by low rainfalls, dry air, and low temperatures in the winter. Judging from the wide range of scatter in the reduction of ventilatory function, individual changes attributable to air pollution appear to vary considerably. Inhalation of soot or SO2 stimulates tracheal mucus, causing non -infectious inflammation. Then viral or bacterial infection leads to spreading inflammation (asthmatic patients tend to suffer from this, in addition to the allergic inflammation). The patient will tend to have swollen tracheal mucus, chronic edema or bronchial spasms. A long-range follow-up study of these children is recommended to cover the period from childhood through adolescence to adulthood, in order to determine the extent to which air pollution influences ventilatory capacity.

10349

Kamraj-Mazurkiewicz, Krystyna

EFFECT OF CARBON MONOXIDE POISONING IN PREGNANCY ON THE FETAL CENTRAL NERVOUS SYSTEM BASED ON A CASE OBSERVATION. ((Wplyw zatrucia tlenkiem wegla w okresie ciazy na osrodkowy uklad nerwowy plodu na podstawie obserwowanego przypadku.)) Text in Polish. Ginekol. Polska (Warsaw), 38(3):291-294, 1967. 8 refs.

Little is known about the effect of transitory CO poisoning of an expectant mother on the development of the unborn child. A few reported German and Polish cases are discussed where expectant mothers suffered CO poisoning with periods of unconsciousness ranging from 30 min. to 5 hr. In the Polish case, the mother was poisoned in the seventh month of pregnancy. While the mothers did not show any neurological symptoms after regaining consciousness, the carbon monoxide in each case exerted a damaging and lasting effect upon the fetus or neonate. Fetal effects included brain damage, retardation, idiocy, and severe and vast necrosis in the central nervous system, leading to death within a few hours or days. The severity of the damage appears to be related to the month of pregnancy, with the fetus being particularly vulnerable shortly before parturition. It is not resolved whether carbon monoxide acts directly through the circulatory system on the fetal nervous system or whether the mother's oxygen deficiency brought about by carbon monoxide poisoning causes secondary damages to the fetal brain. A Caesarean delivery should be effected in order to permit the child to exhale CO through the lungs.

10396

R. V. Borisenkova, T. A. Kochetkova, A. V. Kozlova

THE PROBLEM OF THE INTERMITTENT ACTION OF DUST. (K voprosu ob intermittiruyushchem deistvii pyli.) Text in Russian. Gigiena Truda i Prof. Zabolevaniya 12(2):6-13, 1968. 5 refs.

Six groups of albino rats were exposed to ore dust containing 69.5% Si02, 14.7% Zl203. 5.46% iron oxides, etc. The groups were exposed to different concentrations, ranging from 50 to 500 mg./cu m, and for different periods of time. The product of exposure time and concentration was the same for all groups so that groups exposed at a high concentration were exposed for a shorter time and conversely. Determination of pulmonary collagen lipids, and dust contents as well as microscopic examination, showed that 6-12 months after the inhalations the histochemical changes were similar in all groups. In particular, the group exposed to a lower concentration for a longer period of time exhibited more pronounced pneumoconiotic symptoms. The group exposed to higher concentrations for a shorter period of time exhibited more pronounced pneumoconiotic symptoms. The group exposed to higher concentrations for a shorter period of time exhibited more severe changes in the upper respiratory tract.

10577

Biersteker, K.

POLLUTED AIR. CAUSES, EPIDEMIOLOGICAL SIGNIFICANCE, AND PREVENTION OF ATMOSPHERIC POLLUTION. (verontreinigde lucht. Ontstaan, medische betekenis en bestrijding van verontreinigde buitenlucht.) Text in Dutch. Assen, The Netherlands, Van Gorcum & Co., (1966). 140p. 139 refs.

The effects of air pollution on man and the study of these effects are discussed under these chapter headings: General information on the air pollution problem; Qualitative and Quantitative significance of air pollutants as potential disease agents in Rotterdam; Man as receptor of air pollutants; Methods used in epidemiology to discover the relationship between air pollution and human mortality an morbidity; Personal study of the effects of air pollution on mortality and morbidity in Rotterdam; Effects of acute air pollution; Effects of subacute air pollution; search for a safe air pollution concentration; Air pollution and chronic non-specific lung disease mortality; Air pollution and lung cancer mortality; Discussion of findings in connection with research done elsewhere; and Need for and use of standards in air pollution control. Statistical information and tables are appended. Chapters are summarized in Dutch and in English.

11552

Ambrosi, L., F. Vimercati, and C. di Nunno

LARGE LYMPHOCYTES IN THE BLOOD OF PATIENTS WITH CHRONIC LEAD POISONING. ((Sui grandi linfociti del sangue dei saturnini.)) Text in Italian. Med. Lavoro 59(2):125-135, Feb. 1968. 16 refs.

High percentages (19-59%) of large lymphocytes were found in the peripheral blood of 20 patients with saturnism employed in the manufacturing of storage batteries. These cells, stained by the method of Unna-Pappenheim, showed intense cytoplasmic basophilia. In the peripheral blood of 20 subjects not exposed to lead, the percentage of large lymphocytes was within normal limits (2-19%). The results are discussed on the basis of bibliographic data on the significance of the large lymphocytes and of changes of Coombs' test in saturnism. The usefulness of the determination of large lymphocytes in saturnism is emphasized.

11568

Horn, K.

AN UP-TO-DATE REVIEW OF THE EFFECTS OF AIR POLLUTION ON THE POPULATION. ((Uber die Auswirkung der Luftverunreinigung auf die Bevolkerung - Eine neure Ubersicht-)) Text in German. Z. Ges. Hyg., 14(6):410-413, June, 1968. 24 refs.

The effects of the increasing incidence of air pollution on human health are discussed. Distinction is made among the immediate (24-48 hr.), delayed (weeks to months), and chronic effects (years) of exposure to air pollution. Four areas considered are: non-specific respiratory diseases; experimental and epidemiological studies on chronic effects of air pollution; studies on premorbid conditions resulting from air pollution; and incidence of lung cancer. Air pollution is viewed as one of many etiological factors influencing incidence of colds, influenza and other respiratory conditions, but it may be a precipitating factor in the development of chronic conditions. Statistical correlations between air pollution (oxides of nitrogen, sulfur, and silicon) and urban incidence of chronic bronchitis, keratoconjunctivitis, atonia and penumonia have been reported. Rheumatic heart disease seems more related to socioeconomic factors than to air pollution. Urban children exposed to air pollution show microcytic anemia and retardation of bone development. Correlation between urban air pollution and lung cancer has been noted. A decrease in lung cancer mortality was reported among British immigrants to USA, Australia or South Africa even though their cigarette consumption remained the same or increased.

11907

Ishizaki, Tatsushi, Sohei Makino, Terumasa Miyamoto, and Taro Kodama

A FOLLOW UP STUDY OF THE DAILY INCIDENCE OF RESPIRATORY SYMPTOMS AMONG A GROUP HAVING CHRONIC BRONCHITIS IN CONNECTION WITH AIR POLLUTION OF TOKYO-YOKOHAMA AREA. Text in English. Asian Med. J., 11(9):1-12, Sept. 1968. 12 refs.

Sixty-three persons (21-55 yrs.) with symptoms of sneezing, running nose, coughing, phlegm, throat irritation, headache and fever, and diagnosed to have chronic bronchitis as a result of examination, spirometry and questioning, were selected from 1000 male workers in a casting company in the Tokyo-Yokohama area (a highly polluted, industrial area). The patients were observed from August 1963 through July 1964, during which time their symptoms were correlated with dust fall, sulfation rate, daily visability, wind speed, suspended particles, and sulfur dioxide. The significant positive relationships found between sneezing and dust fall during the whole observation period, between sneezing and sulfur dioxide and phlegm and sulfur dioxide during the first 8 months, and between phlegm and suspended particulates suggest that patients with chronic bronchitis are sensitive to irritants in the air. It appears from the negative relationship between headache and mean velocity that an environmental factor might be involved.

11932

Courvoisier, P.

THE PENETRATION OF FLUCTUATIONS OF METEOROLOGICAL ELEMENTS INTO BUILDINGS. (Ueber das Eindringen von Schankungen der meteorologischen Elemente in Gebaeude). Arch. Meteorol., Geophys., Bioklimatol., Ser. B., 2(3):161-173, 1950. 7 refs. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 19p.

Meteoropathology is examined in an attempt to gain insight into human pre-sensing of weather changes, even inside of buildings. Atmospheric pressure, environmental elements, and fluctuations and their attenuation inside of buildings are treated in theoretical detail. Special attention is given to fluctuation of ozone concentration inside of structures. The complicating effect of time lag between inside and outside conditions is stressed.

11935

Morelli, A. and P. Preziosi

ACID PHOSPHATASE IN THE BRAIN DURING SUBACUTE INTOXICATION WITH TETRAETHYL LEAD. (La fosfatasi acida encefalica in corso di intossicazione subacuta con piombo tetraetile). Folia Med. (Naples), vol. 36:718-722, 1953. 3 refs. Translated from Italian. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 5p.

Brain acid phosphatase was studied in four rabbits acutely or subacutely intoxicated with tetraethyl lead. The acutely intoxicated rabbits received the toxic substance intravenously in gum arabic emulsion in doses of 60 or 90 mg Pbt/kg of body weight. The subacutely intoxicated rabbits received 10 or 50 Pbt/kg of body weight in 95% alcohol subcutaneously on 10 successive days. No significant change in the distribution of the enzyme in the various areas of the encephalon was observed between control animals and rabbits acutely and subacutely treated. Tetraethyl lead was found in the brain tissue of all animals: 4.26 mg in animals treated with 60 mg/kg; 43.57 mg in animals treated with 90 mg/kg; and 0.43 and 0.15 mg in animals treated with 10 and 50 mg/kg. The findings are considered significant, since many drugs exert an effect on brain phosphatase activity.

11936

Kapalin, V.

THE EFFECT OF CERTAIN EXTERNAL ENVIRONMENTAL CONDITIONS ON THE ORGANISM OF SCHOOL CHILDREN. (Odraz vlivu nekterych zevnich podminek na organismu deti skolniho veku). Cesk. Hyg. (Prague), 11(8):468-472, 1966. 10 refs. Translated from Czech. by Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 9p.

In the fall of 1965, three groups of Slovak children were examined for the effects of environmental conditions on body height, structure, and hemoglobin levels. The first group had spent the summer in a recreational area; the second lived in an area highly polluted by arsenic emissions from a power plant; and the third group lived in a less polluted area and had spent the summer at scout camps. Measurements in the spring of the year had indicated the maximum mean height of children from the unpolluted area agreed with the overall Slovak average. Though lower growth levels for the children from the polluted area were not statistically significant, no child in the second group was classified as very tall. Marked differences were established in hemoglobin values and warning differences in red blood cell values. In the fall, there was substantially narrower scatter of the relative heights of children who had spent the summer in the scout camps and recreational area. Extremes of body structure within each group had disappeared and differences in hemoglobin levels were less marked, indicating the leveling effect of proper diets and purer air. The children from the polluted area continued to exhibit not only decreased hemoglobin values but decreased red blood cell counts.

11941

Kononova, V. A. and V. B. Aksenova

ATMOSPHERIC AIR POLLUTION DISCHARGES FROM SYNTHETIC ALCOHOL PLANT AND THEIR EFFECT ON MORBIDITY, SANITARY AND LIVING CONDITIONS OF THE POPULATION. Gigiena i Sanit., no. 9:3-7, 1961. 5 refs. Translated from Russian. 7p.

Investigations were undertaken to determine the extent of the area affected by the discharges from a synthetic alcohol plant and the effect of these discharges on the morbidity rate and sanitary and living conditions of the population. The area was found to be polluted by hydrocarbons, hydrogen sulfide, and sulfuric gas in a radius up to 3 km and by unsaturated hydrocarbons up to 500 meters. In a survey of the local population, many complaints were associated with the wastes emitted by the plant (headaches, dizziness, loss of appetite, etc.). The complaints were most numerous close to the plant. During a three-year period, the incidence of respiratory diseases in children in the plant area exceeded the morbidity rate of children in a control area. It is concluded that children's institutions and residential settlements should be located at least 3 km from the plant. (Author conclusions modified)

11947

Bencko, V.

ARSENIC IN HAIR OF PROFESSIONALLY NOT EXPOSED POPULATION. (Arzen vo vlasoch neprofesionalne exponovanej populacie). Cesk. Hyg. (Prague), 11(9):539-543, 1966. 14 refs. Translated from Czech. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services; 10p.

Excessive air pollution by arsenic was observed in the area of a thermal power plant. The hair of ten-year old boys living in the vicinity of the plant was tested for arsenic content in a study of the feasibility of using arsenic hair determinations as indicators of nonprofessional exposure. As normal values of arsenic content in children's hair were not available, the obtained values were compared with the values of a control group of ten-year old boys from a village where arsenic levels fell within a normal range. In both areas, a comparatively broad scatter span of arsenic values was observed. However, the average value for the boys from the polluted zone was 3 1/2 times higher than that for the boys from the unpolluted area. The increased content of arsenic in hair is attributed to increased amounts of arsenic in vegetables and fruit as a result of soil contamination and to direct hair contamination by flue dust.

11953

Toyama, T., H. Kahyo, J. Kagawa, S. Yagura, S. Adachi, N. Yamamoto, F. Iriyama, F. Kumagai, S. Osawa, K. Nakamura, and T. Nakamura

STUDY ON THE PREVALENCE OF RESPIRATORY SYMPTOMS IN A RURAL AREA (KASHIMA, IBARAGI PREF.) OF JAPAN. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 1(1):24-35, 1966. 14 refs. Translated from Japanese. 53p.

A survey on respiratory diseases (asthma, bronchitis, common cold, cough) was conducted in Kashima, a rural area in Japan. A revised questionnaire of the British Medical Research Council was used for the survey which was conducted along with simple pulmonary ventilatory function tests on 678 randomly selected adults of both sexes 40 to 65 years of age. The atmospheric sulfur dioxide concentration, the aerosol concentration, wind direction, and wind velocity were simultaneously measured. The SO2 concentration was below 0.01 ppm, the weight density of the suspended particulates ranged from 500 micrograms/cu m (maximum) to 13 micrograms/cu m (minimum); the average was 90 micrograms/cu m. The response rate to the interview survey was high: 91.6% for males; 95.5% for females; and 93.8% for the total. Prevalences of respiratory symptoms were computed for each question; relationships to sex, age, and the amount of smoking were determined. The survey results were also compared to those obtained in England, the U. S., and Canada. The prevalences in males were higher than in females; those of older persons were higher than of younger ones; and those of smokers, higher than those of nonsmokers. International comparison revealed that the prevalences in the Kashima area were considerably lower than those in the agricultural areas of England, the U. S., and Canada. The pulmonary function tests revealed a slightly higher forced expiratory volume than that of mail-truck drivers in London.

11955

Oshima, Hidehiko, Masayuki Imai, Noriko Fujita, Hisako Fukuda, and Katsumi Yoshida

AIR POLLUTION AND MORBIDITY IN THE YOKKAICHI AREA. Taiki Osen Kenkyu (J. Japan. Soc. Air Pollution), 1(1):36-45, 1966. 18 refs. Translated from Japanese. 33p.

Between 1961 and 1962 and 1963 and 1964, the dust fall and the atmospheric sulfur dioxide concentrations were measured at 13 stations in the Yokkaichi area. The dust fall was determined by means of sedimentation; the SO2 concentration, by the PbO2 method. Equivalence lines were drawn each year from the annual averages. The monthly National Health Insurance records were used to study the effect of these pollutants on humans of all age groups. Calculation of the correlation coefficients revealed a definite correlation between such diseases as bronchitis, eye diseases, and laryngopharyngitis in the infant age group as well as bronchial asthma in the age group above 50. The correlation was particularly high between laryngopharyngitis among infants from age 0-4 as well as bronchial asthma among adults or more than 50 years of age. The diseases were correlated with SO2 rather than with the dust fall. Bronchial asthma increased from the middle of 1961 to the present in the polluted area, which coincides with an increase of the SO2 concentration; no such pronounced increase was observed in the non-polluted area.

11970

Langmann, R.

THE EFFECTS OF AIR POLLUTANTS ON SELECTED POPULATION GROUPS. (Die Wirkung von Luftverun-

reinigungen auf ausgesuchte Bevoelkerungsgruppen). Oeffentl. Gesundheitsdienst, 22(5):179, 184, 1960. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 13p.

Various studies were undertaken to determine the transient effect of industrial dust on lung function. In one test, healthy male subjects averaging 25 years of age were exposed for six hours in a working area of a steel and iron foundry to 18 ppm carbon monoxide and 0.08 ppm sulfur dioxide. No worker demonstrated the onset of any acute [illegible]s of respiratory function. Only one difference was noted in [illegible]TV values as determined by the Fowler Test before the start and after the end of the working day. The difference was not statistically significant. Tests were also conducted with workers exposed to 0.24 ppm in the foundry pit. No detectable changes were recorded with respect to vital capacity, maximum expiration value, and respiratory minute volume. However, respiration rate increased by 11.9% and depth of respiration declined by 9%, suggesting that dust potentiates SO2 action. The effects of chronic exposure to dust in a study concerned with measurement of pulmonary function in a group of older persons need to be taken into account. Subjective reactions to SO2 concentrations less than 1 ppm were noted in older emphysema patients when the weather was foggy and small amounts of hydrogen sulfide were present in the atmosphere.

12344

Kapalin, V.

OSSEOUS AGE - ITS EVALUATION AND THE NORMAL DEVELOPMENT OF OSSEOUS MATURATION IN CZECH CHILDREN OF PRE-SCHOOL AND SCHOOL AGES. (Kostni vek - jeho hodnoceni a normalni postup kostniho zrani u ceskych deti predskolniho a skolniho veku). Cesk. Hyg. (Prague), 12(5):233-245, 1967. 36 refs. Translated from Czech. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 20p.

Osseous age is defined as the period in human life during which bones increase in size and become mature. A total of 2424 x-ray pictures of the left wrist and hand of Czech children, ages 6-16, were evaluated by the method of Greulich and Pyle. Whereas the growth of girls was comparable to those of American girls, there was a delay of about one year in Czech boys during early school years. A definite relationship was demonstrated between level of growth and osseous age. Children living in polluted areas experienced a retarded osseous maturation as compared with those living in clean-air areas. A new method was developed for evaluating osseous age, which was used to compile statistics.

12490

Ichioka, M., H. Kita

EFFECTS OF AIR POLLUTANTS (1). Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 2(1):59-69, 1967. 2 refs. Translated from Japanese. 49p.

Twenty-one air pollution studies are summarized. Of the 21, 18 concern the effects of pollutants on human health, and in particular, their relationship to respiratory diseases and respiratory functions; the remaining studies deal with economic losses caused by pollution, corrosion of metals, and the adsorptive capacity of indoor surfaces for gaseous substances. Subjects covered include a method for estimating the absorptivity of the airway mucuous membrane for gaseous sulfur dioxide and nitrogen dioxide; in the incidence of chronic bronchitis in polluted and unpolluted areas; effects of pollution on the pharynx and larynx of school children; effects of automotive exhausts on human health; the deposition of granular and gaseous substances in the respiratory tract; the effect of NO2 on pulmonary CO diffusing capacity and airway resistance; effects of O3 on pulmonary volume; effects of NO2 on ventilatory functions in healthy individuals; the relationship between chronic respiratory diseases and air pollution; effects of SO2 on airway sensitization; an epidemiological investigation of a pollution episode involving a sulfuric acid plant; and the effect of control measures on mortality figures for heart and respiratory diseases.

12960

Einbrodt, H. J. and U. Amt

GRAIN-SIZE DUST DISTRIBUTION IN THE LUNGS OF INHABITANTS IN POLLUTED AND UNPOLLUTED AREAS. (Die Korngrossenverteilung in Lungenstauben von Bewohnern aus Gebieten mit und ohne Luftverschmutzung). Text in German. Arch. Hyg., 153(2):98-104, 1969. 28 refs.

Dust in the lungs of ten diseased persons from non-industrial areas and 15 persons from industrial areas were analyzed. In six cases dusts found in the lymph nodes were also available. None of the persons had died of any lung disease or of any disease due to dust inhalation. All dusts were separated from the lungs and lymph nodes by the formamide method. Diameters of the dust particles were determined with electron and light microscopes. The frequency maxima of the particle diameters, as well as the medians of the particle size plots, were found to lie below 1 micron. An approximately logarithmic normal distribution was found. The dust particle size spectra of three samples (lung dust from industrial areas, lung dust from residential areas, and lymph node dust from industrial areas) differed little from each other and agreed with the corresponding spectrum of airborne dust in large industrial cities. Electron microscopy further showed that only fine dust particles accumulate in the lungs; large particles either do not penetrate into the interstitial tissue, or if they do, they are eliminated again. Direct particle size analysis showed that quartz particles of more than 3.5 microns predominated.

13059

Chovin, P. and L. Truffert

DISTRIBUTION AND SIGNIFICANCE OF CARBON MONOXIDE AS AN ATMOSPHERIC POLLUTANT. IMPORTANCE OF OTHER POLLUTANTS EMITTED IN AUTOMOBILE EXHAUST. (Distribution et signification de l'oxyde de carbone en tant que polluant atmospherique. Importance des autres polluants emis par les gaz d'echappement des vehicules automobiles). Text in French. Pollut. Atmos. (Paris), no. 39: 148-155, July-Sept. 1968. 66 refs.

The distribution of carbon monoxide is discussed, particularly that arising from automobile exhaust gases, and an empirical formula is given for calculating the carbon monoxide content at any height, given a background concentration, the number of vehicles per hour, and a constant which in turn is a function of the width of the road and the height of the exhaust. The hemoglobin-CO reaction in the blood is reviewed, and studies made on police officers in Paris are cited in which levels of blood carbon monoxide were determined. In non-smokers, there was a definite rise in concentration. Levels fixed in California for carbon monoxide in ambient air are cited as 30 ppm for 8 hours or 120 ppm for 1 hour for serious exposure; exposure of 240 ppm for 1 hour can cause acute illness, since 10% of the hemoglobin is bound as carboxyhemoglobin. Effects of carbon monoxide in man other than combination with hemoglobin are cited, i.e., effects on the blood-forming apparatus, circulatory system, and the eye. Other pollutants arising from automobile exhaust are mentioned, including lead, oxides of nitrogen, compounds produced by photochemical reactions with ozone, and aldehydes. In conclusion, the many differences in allowable levels of carbon monoxide in Russia and western countries are pointed out, and the differences in carbon monoxide ingestion between smokers and non-smokers. A common sense approach to setting standards for air quality is advocated.

13065

Bernard, Claude and Yves-Michel Gargouil

PERMEABILITY OF THE EMBRYONIC MYOCARDIAL MEMBRANE OF THE RAT; A STUDY OF ITS EVOLUTION DURING EMBRYOGENESIS BY THE USE OF THE INHIBITORS TETRODOTOXIN, MANGANESE, AND TETRAETHYLAMMONIUM. (Les permeabilities de la membrane myocardique embryonnaire de rat; etude de leurs evolutions au cours de l'embryogenese a l'aide d'inhibiteurs: tetrodotoxine, manganese, tetraethylammonium). Text in French. Compt. Rend. Acad. Sci. (Paris), vol. 267 Ser. D:1626-1629, Nov. 13, 1968. 17 refs.

Tetrodotoxin at a dose level of 0.00001 g/ml, decreased the action potential in isolated embryonic rat hearts at 13, 16, and 21 days post-coitus, presumably by specifically inhibiting sodium flow. Manganese, in doses of 4 mM/L, shortened the plateau of the action potential, its effect being more noticeable at 13 days than at 16 or 21 days. Tetraethylammonium chloride, 20 mM/L also inhibited the action potential; in this case the age of the embryos made no difference.

13625

Lindberg, Walter

AIR POLLUTION IN NORWAY. II. PUBLIC HEALTH ASPECTS OF AIR POLLUTION - A LITERATURE STUDY. (Den Alminnelige Luftforurensning i Norge. Luftforurensning som Helseproblem, - en Litteraturstudie.) Translated from Norwegian. Oslo Univ. (Norway), p. 66-77, 1968.

This presentation discusses functional and anatomical changes arising from diseases caused by air pollution. The discussion includes air pollution episodes, pollutants known to cause specific effects (arsenic compounds, mercury, beryllium compounds, manganese compounds, and lead). Lead and carbon monoxide are discussed in greater detail. Emphasis is also placed on respiratory irritations caused by SO2, nonspecific upper respiratory diseases, the effect of air pollution on the occurrence of colds, smoking, chronic bronchitis emphysema, bronchial asthma, lung cancer, and heart disease.

13868

Yokoyama, Eiji

VARIATIONS OF VENTILATORY DYNAMICS IN EXPERIMENTAL EXPOSURE TO SO2 AND NO2. (SO2 oyobi NO2 jikken-bakuro-ji no kanki- rikigaku-chi no henka). Text in Japanese. Arerugi Nippon Zasshi (Jap. J. Allergy), 16(10):56-60, Oct. 1967. 17 refs.

Six healthy adults aged 20 to 36 were experimentally exposed to SO2 gas, and five healthy adults aged 18 to 37 were exposed to NO2 gas. Pulmonary flow resistance, pulmonary compliance, FRC, and respiratory rate were measured. Concentrations of SO2 during the experiment were 36 to 40 ppm; those of NO2 were 6 to 17 ppm. Experimental exposure to these two gases and similar analyses were made in anesthetized dogs and guinea pigs. Flow resistances of the lungs and thorax because of bronchoconstriction were commonly increased by both SO2 and NO2 in three experiments. The following response to these gases, however, differed. Increase of pulmonary flow resistance to SO2 was inhibited by the subcutaneous administration of 0.7 mg of atropine sulfate, but no inhibition by atropine was observed with NO2. Respiratory rate was increased by NO2 and decreased by SO2 in an experiment with guinea pigs. Variation in pulmonary compliance was more marked with NO2 than with SO2. The SO2 was found to stimulate mainly the upper respiratory tract (nose, throat, and upper trachea) because it is water-soluble and because more than 95% of it is absorbed within the upper respiratory tract. The NO2 was found to stimulate mainly the peripheral portion of the lung because it does not dissolve easily in water and thus is easily brought to the peripheral portion of the respiratory tracts. Nitrogen dioxide was found to have an oxidizing action and to damage the pulmonary mucosae more markedly than the reductive action of SO2.

14480

Yoshida, R., K. Motomiya, M. Adachi, K. Ito, M. Kubo, H. Kasuga, K. Hida, and J. Ooeda

STUDIES ON BRONCHIAL ASTHMA AMONG PRIMARY SCHOOL CHILDREN IN CITY 'B' IN SHIZUOKA PREFECTURE. 1. EPIDEMIOLOGICAL STUDIES. (Shizuoka-ken B-shi shogakko jido no kikanshi zensoku ni kansuru kenkyu. 1. Ekigaku teki kosatsu). Text in Japanese. Nippon Eiseigaku Zasshi (Japan J. Hyg.), 24(1):94, April 1969.

A survey was conducted of the absentee rate at six primary schools (three in polluted areas and three in non-polluted areas) from Sept. 1966 to March 1967. Both percentage of absentee days and number of children absent were higher at the control schools, but the rate of respiratory tract disease among absentee children was higher at the schools in polluted areas. From April 1967 to March 1968, both percentages of absentee days and number of children absent were higher at the schools in polluted areas. The polluted area schools had a higher level (1.19%) than the control schools (0.52%) of the children suffering from asthma. Furthermore, average frequency of absence per child was higher at the former (3.13 times) than at the latter (1.54 times). On close medical examination of children with suspected asthma, the percentage of children diagnosed as having bronchial asthma was 0.65% for control schools and 1.21% for the others. Furthermore, 0-80% of the suspected cases of asthma determined by questionnaires can be diagnosed clinically as asthma.

14493

Chen, C., K. Okamoto, and T. Nakajima

THE HISTOPATHOLOGICAL STUDY ON THE LUNG OF MICE EXPOSED TO 0.7-0.8 PPM NO2 GAS FOR A MONTH. (NO2 gas (0.7-0.8 ppm) ni renzoku ikkagetsukan bakuro shita mausu hai no byori soshiki gaku teki kenkyu). Text in Japanese. Nippon Eiseigaku Zasshi (Japan J. Hyg.), 24(1):91, April 1969.

To study the effect of exposure to nitrogen dioxide gas on lungs and trachea, mice four weeks of age were placed in a exposure chamber and continuously exposed for 30 days to 0.7 to 0.8 ppm concentrations of nitrogen dioxide gas, supplied by heating liquid NO2. Air for dilution was passed through a dehumidifier, filter, and activated carbon. Air velocity in the chamber was 5 cm/sec, temperature 24 to 26 deg, relative humidity 40 to 70%, and the light transmission rate of dust was less than 1%. The mice were given ample food and water. A control group of mice was raised under similar conditions but in the absence of NO2. No statistically significant difference in growth rate was observed between groups. On the 15th day of exposure to the gas, accelerated secretion of mucus, degeneration, and desquamation were observed at the mucus epithelium of the trachea. Lung congestion and increased secretion of mucus in bronchial tubes was also noted. By the 30th day, advanced negative and degeneration of the mucus epithelium was evident in both lungs and trachea. The results show that catarrhal changes in lung and trachea occur following exposure to less than 1% (sic; 1 ppm/) NO2 gas.

14553

Ichinosawa, A., H. Takahashi, Y. Tsunetoshi, and T. Shimizu

ETIOLOGICAL CONSIDERATIONS WITH RESPECT TO CHRONIC BRONCHITIS IN JAPAN. (Honpo ni okeru mansei kikanshien no byoin-teki kosatsu). Text in Japanese. Nippon Rinsho (Japan. Clin.), 25(9):2054-2063, Sept. 1967. 34 refs.

The etiological influence of air pollution on the incidence of chronic bronchitis is discussed. Six areas in Osaka and its vicinity were classified into three severely, one moderately, and two mildly polluted areas. Concentrations of SO2, NO2, and ozone and amount of settling dust were measured. Incidence of chronic bronchitis in the severly polluted areas was higher (twice as great in males and three times as great in females) than that in the mildly polluted areas. Males were more frequently and severly involved than females. Smoking and SO2 concentration were the most important causes of this disease in any district, and the corr[illegible]n between the concentration of SO2 and occurrence of [illegible]nic bronchitis was demonstrated mathematically. In younger age groups, certain constitutional factors influence the occurrence of the disease, while in older age groups, environmental factors are more influential. It was difficult to determine the minimal predisposing conditions necessary to provoke chronic bronchitis, since there were so many variations in physical conditions among the subjects.

14682

Horn, K.

ON THE EFFECTS OF AIR POLLUTION ON THE POPULATION. A NEW REVIEW. (Ueber die Auswirkung der Luftverunreinigung auf die Bevoelkerung. Eine neuere Uebersicht). Text in German. Z. Ges. Hyg. (Berlin), 14(6):410-413, June 1968. 24 refs.

A review of the known effects of air pollution on human health is presented. In polluted areas, the mortality rate from diseases of the respiratory tract is nine times higher than in rural areas. A linear relationship was found to exist between the smoke content of the atmosphere and diseases of the respiratory tract and the circulatory system. The disease rate of female employees of radio stations in five U. S. cities also showed a relationship between diseases of the respiratory tract and air pollution. A connection between the physical condition of school children and the content of free silicon dioxide in atmospheric dust was found in the USSR. Japanese studies also confirm an increased occurrence of diseases of the respiratory tract and the eyes in polluted areas. In an industrial area with heavy smoke and dust pollution but low SO2 pollution, Czech scientists found lower hemoglobin concentrations but considerably higher alkaline phosphatase concentrations and a high incidence of rickets in children. In a heavily SO2-polluted area of northern Bohemia, children had considerably higher numbers of erythrocytes but less hemocrit. According to other Czech studies, the bone development of children living in heavily polluted areas was retarded.

15233

Burema, L., K. Biersteker, and H. de Graaf

AIR POLLUTION AND PUBLIC HEALTH IN ROTTERDAM. RESULTS OF AN INVESTIGATION ON THE ACUTE EFFECTS OF AN EXCEPTIONAL AIR POLLUTION INCREASE ON PUBLIC HEALTH. (Luchtverontreiniging en volksgezondheid in Rotterdam. Resultaten van een onderzoek naar de acute affecten van bijzondere luchtverontreinigingstoename op de volksgezondheid). Commission on Earth, Water and Air, Rotterdam, 58p., 1964. 35 refs. Translated from Dutch. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 54p., Sept. 29, 1969.

An investigation was made of possible direct effects of three air pollution peaks on human health in Rotterdam. For this purpose, daily mortality and morbidity data were collected for December 1952, January and February 1959, March 1961, and December 1962. High air pollution concentrations compared with average winter levels existed on January 29, 1959, March 8, 1962. Results show small increases in general mortality and hospital admissions of persons over 50 years of age for cardiovascular and respiratory diseases each time. The increases in mortality were greatest among persons over 60 years of age and in the diagnostic groups of tumors and cardiovascular diseases. For 1962, a more detailed search was made for data that might support the assumption of a casual relationship with air pollution. It was found that a control population, exposed to the same weather but less air pollution, showed a much less marked effect on mortality and sick leave absenteeism. In 1952, Rotterdam was covered by dense fog from December 5-9. Though London experienced a severe effect that time, there was no clear effect in Rotterdam. No air pollution measurements were made in 1952, but it is common knowledge that the emission of pollutants, especially of SO2, was much lower 10 years ago. The findings seem to indicate that Rotterdam has reached a level of industrialization and urbanization at which air pollution effects on human health begin to manifest themselves during abnormal weather once or more every 3 years. (Author summary modified)

15703T

Delwaide, P., C. Heusghem, and A. Noirfalise

CHRONIC LEAD POISONING: BIOCHEMICAL LESIONS AND BIOCHEMICAL SYMPTOMATOLOGY. (Le saturnisme: Lesions biochimiques et semeiologie biologique.) Translated from French. Ann. Biol. Clin. (Paris), 26(7-9):987-1001, 1968. 44 refs.

This paper reviews what is known about lead metabolism, and discusses biochemical toxicology, the biosynthesis of porphyrins, iron metabolism, the effect of lead on mature erythrocytes, and other metabolic disturbances. The complexity of lead metabolism precludes any diagnostic value of isolated lead level determinations in blood or urine. To demonstrate the state of impregnation of the organism with this toxin, the test of provoked urinary lead excretion should be performed in the chronic stage. Furthermore, a battery of assays including the levels of delta-ALA, PBG, CP and free PP in erythrocytes are required to reveal the biochemical disturbances at the target level where individual variations may play a role.

16047

Chaneles, J.

ACTION OF IODINE ON CHRONIC FLUOROSIS. (Action de l'iode sur la fluorose chronique). Compt. Rend., vol. 102:863, 1929. Translated from French. Public Health Service, Air Pollution Technical Information Center, 2p., Sept. 15, 1969.

Four groups of five rats each were subjected to a diet of bread and milk for 6 months. The rats in the first group were fed 50 mg/kg sodium fluoride per day; the second group, 2 mg sodium iodide per animal; the third group, fluoride and iodide at the same time; and the fourth group received neither of these substances. The growth of rats receiving fluorine was better than that of the control group for 3 months, then slackened, and on the sixth month was less. The hair was less silky and blood marks appeared at the nostrils and on the vagina. The rats that were iodized and fluoridized had the same symptoms, but more accentuated. Iodide given alone favored growth. The teeth of fluoridized rats had uniform whiteness and marked elongation of superior incisors. The enamel presented undulated prisms and numerous Retzius brown streaks; superficial pigmentation was completely lacking. In the group receiving fluoride and iodide, the alterations were less marked; the teeth were more compact. Bones and organs were also studied, but noted modifications were not substantial.

16063

Abrosimova, N. M. and R. I. Tatarskaya

PROPERTIES OF ADENOSINE TRIPHOSPHATASE IN VARIOUS FRACTIONS OF FISH EGGS. (O svoisvakh adenozintrifosfatazy v razlichniykh fraktsiyakh yaits ryb). Biokhimiya, vol. 28:486-496, May-June, 1963. 8 refs. Translated from Russian. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 20p., Sept. 30, 1969.

The enzyme activity of fish egg adenosine triphosphatase (ATPase) and the relationship of the ATPase to the Ca(2+) ion was studied. An EDTA concentration of 0.005 and higher completely removes ATPase activity of extracts from infertile sturgeon eggs. The effect of Mg(2+), Mn(2+), Ca(2+), Ba(2+), and Sr(2+) was studied in the presence of 0.001 M EDTA. All the cations demonstrated an activating effect. In protein fractions obtained by the precipitation of extracts and homogenates with (NH4)2SO4 and subsequent dialysis, ATPase activity was found only in the presence of bivalent cations. The cations, from greatest to least, according to the degree of activating effects, were arranged in the order Mn(2+), Mg(2+), Ca(2+); Sr(2+), and Ba(2+) were inactive. In spite of the presence of a quite active 5'-nucleotidase in the protein precipitates, ATPase activity could be singled out by carrying experiments at acid pH values. In the pH zone equal to 5.5 5'-nucleotidase was inactive. Subcellular fractions of 450 g, 20,000 g, and a supernatant were isolated by differential centrifugation in sucrose. Addition of bivalent cations caused the activation of ATPase; Mg(2+) ions activated more strongly than Ca(2+) ions. Data indicated that the presence of Ca(2+) ions which are required for fertilization cannot be related to their activating effect on ATPase, since neither Mn(2+) nor Mg (2+) can replace Ca(2+) in the process of fertilization. It was established that pyrophosphatase of sturgeon eggs is activated, by Mg(2+) but not Mn(2+). Thus, it was assumed that orthophosphate is split off from ATP by the action of ATPase and not pyrophosphate. The slight splitting of phosphate from ADP, established earlier, demonstrated that the ATPase of sturgeon eggs splits from ATP only one terminal phosphate. (Author summary modified)

16136

Ishizaki, Tatsushi

SYMPOSIUM ON ASTHMA. EFFECT OF AIR POLLUTION UPON BRONCHIAL ASTHMA. (Shinpojyumu---Zensoku). Text in Japanese. Nippon Naika Gakkai Zasshi (Tokyo), 58(12):1287-1292, Dec. 10, 1969. 23 refs.

Presumable causes of asthmatic attacks are allergy response, disease of the trachea, and a combination of physical and mental factors. In actual fact, these factors are not inseparable: each contributes to the resistance against inhaled antibodies and each is highly sensitive to chemical mediators isolated from cells under the influence of antibody compounds. For this reasons, bronchial asthma is characterized by a constitutional predisposition to allergy response, i.e., an inclination to produce a resistance 'factor' against an antibody. The present study centers on the relationship between the resistance factor and the sensitivity to chemical mediators and air pollution. Asthmatic attacks were found to be closely related to weather conditions: more were observed on rainy days and during unseasonable weather than on fine days. The risk of attacks increased when the temperature declined 3 C below that of the previous day. Another finding was that SO2 inhalation increased stimulation through the vagii. Asthmatic patients were more sensitive to SO2 inhalation than healthy persons. In some patients, bronchoconstriction was eased by atropine injections. Today chronic bronchitis is generally used as a determinant index to the effect of air pollution on asthmatic patients: air pollution is considered to influence asthma with respect to an infection factor. It is not definitely known, however, whether air pollution results in bronchial asthma.

16177

Uno, A.

THE MORTALITY OF THE AGED IN AN AIR-POLLUTED AREA IN JAPAN. (Taiki osen chiku ni okeru rojin shibo). Text in Japanese. Nichidai Igaku Zasshi (Nichidai Med. J.), 27(5):584-612, May 1968. 81 refs.

The correlation between respiratory and cardiovascular diseases and atmospheric conditions (temperature and humidity) and smoking was investigated by examining the death rate (1962-1964) from the diseases in longtime residents of Kawasaki city, 60 years and older. The collection ratio of the data was 74%. The mortality figures for persons who had lived in polluted areas of the city longer than five years were 345 males (81.59%) and 281 females (77.55%); the figures for residents of the nonpolluted area were 210 males (70.48%) and 208 females (68.15%). The death rate was high in winter and increased even more in summer when SO2 concentrations were highest (in 1963, the maximum SO2 concentration in the industrial district between July and September was 6.405 mg SO2/day/100 sq cm PbO2). In the polluted area, there was an increase in deaths from cardiovascular diseases, expecially vascular damage to the central nervous system, and pulmonary tuberculosis. Deaths attributed to respiratory diseases had decreased. In the nonpolluted area, there was an increase in deaths from neoplasm in the respiratory organs and from bronchial asthma. Among smokers the incidence of death from neoplasm in the respiratory organs, arteriosclerotic heart disease, and bronchial asthma was highest in the polluted areas. The deaths are correlated with high humidity, low temperature, and reduced visibility.

16515

Hylyi, M. F., D. O. Melnychuk, and M. D. Klymenko

EFFECTS OF SODIUM BICARBONATE, MN(2+), MG(2+) AND ZN(2+) ON THE INTENSITY OF THE RENEWAL OF PROTEINS, GLYCOGEN AND LIPIDS IN THE LIVER AND MUSCLES IN RABBITS. (Vplyv biocarbonatu natriiu, Mn(2+), Mg(2+) i Zn(2+) na intensyvnist onovlenniia bilkiv, hlikohenu ta lipidiv u pechintsi ta m'iazakh kroliv). Ukr. Biokhim. Zh., 40(2):167-172, 1968. 19 refs. Translated from Ukranian. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 9p., Sept. 19, 1969.

Studies of the influence of sodium bicarbonate and the bivalent metal ions Mg(2+), Mn(2+), and Zn(2+) substances favorable to CO2 fixation processes in animal tissue, on the intensity of the renewal of proteins, glycogen, and lipids of the liver and muscles of rabbits are reported. Male rabbits were fed a diet of sodium bicarbonate and sulfuric acid salts of the indicated metals for ten days. The diet caused no noticeable changes in the interrelation of dry substance, lipids, glycogen, and proteins in the liver and muscle tissues. Among changes in the intensity of metabolic processes in substances was the considerable removal of carbohydrates in liver and muscles; this was manifested by the rapid inclusion of acetate-2-C 14 in glycogen and its exclusion. There was a considerable activation of the inclusion of radioactive carbon the tissue proteins, especially in muscle protein. It is concluded that the stimulation of carboxylation processes visibly activates the renovation of carbohydrates and the intensity of the incorporation of radioactivity of protein. Lipid metabolism is influenced to a lesser degree.

16555

Fukui, Syozo

EXAMPLES OF GAS INJURY BY HYDROFLUROIC ACID AND NITROGEN DIOXIDE, AND REMOVAL OF THE GASES FROM WASTE GAS. (Fukka suiso oyobi nisanka chisso ni yoru kogai to sono jogai jisshirei). Text in Japanese. Kogai to Taisaku, (J. Pollution Control), 2(7):481-486, Aug. 15, 1966. 3 refs.

Among the methods of nitrogen-dioxide removal, washing by water or alkaline solutions are only 50% effective. The author investigated a method based on ammonia gas. For the sake of comparison, an experiment using water alone was conducted. Nitrogen dioxide concentration was about 200 to 300 ppm; gas velocity, 0.6 l/min; and water volume, 20 ml. Removal efficiency was only 30 to 40%. Next, washing by a caustic soda solution was examined. The caustic soda concentration was 10% under identical experimental conditions. The rate of removal was 40 to 50%. The rate of nitrogen dioxide removal by ammonia was 85 to 95%. The drawback of this method, however, is that it generates white smoke of ammonium nitrite or nitrate. In the experiments conducted at a plant site, washing by water removed only 12 to 55% nitrogen dioxide while ammonia removed 70 to 93%. Hydrofluoric acid is harmful to silkworms. Mulberry leaves containing 1 mg of fluorine per 100 g of leaves completely killed silkworms. Elimination of hydrofluoric acid was comparatively easy. Satisfactory results were achieved by alkaline washing. The removal rate of this method was higher than 99% and the acid concentration of tail gas was lower than 1 ppm. The mortality rate of silkworms fed untreated mulberry leaves was 3.0 percent; that of controls was 2.0.

16598

Pekker, I. L.

EFFECT OF NITROUS OXIDE ON THE EXPERIMENTALLY INDUCED SPASM OF THE CORONARY VESSELS OF THE HEART. (Vliyaniye zakisi azota na eksperimental'no vyzvan nyy spazm venechnykh sosudov serdtsa). Text in Russian. Kardiologiya (Moscow), vol 6:74-78, July-Aug. 1966. 2 refs.

Anesthetization with nitrous oxide in cases of sthenocardia and of myocardial infarction has found a wide application in the practice of emergency medical treatments and in a series of clinics. Observations made at the Leningrad station of emergency medical treatment have shown that in many patients suffering from sthenocardia and from myocardial infarcion, after anesthetization with nitrous oxide, there appeared on the electrocardiogram symptoms of an improvement of the coronary blood circulation, along with the disappearance of the pain. These observations suggest that nitrous oxide, in possessing analgesic properties, has the ability to expand the spastic coronary arteries. The effect of nitrous oxide was studied in a mixture with oxygen on the 'peripheral' and the 'central' spasm of the coronary arteries. Tests were made on cats anesthetized with urethane. Before the spasm of coronary arteries induced by intravenous injection of pituitrine as well as during its initiation, electrocardiograms were made as a control experiment. After 5 to 6 hours, 5 minutes after inhalation of nitrous oxide in a mixture with oxygen, pituitrine was again introduced into the same cat in the same dosage. The new electrocardiogram was compared with the control one. After removal of the cerebellum, stimulations of various morphological structures of the medulla oblongata were produced with a unipolar electrode by square pulses lasting 5 to 10 sec with an interval of 8 to 10 min. Electrocardiograms were made before, during, and after cessation of the stimulation. After appearance on the electrocardiogram of symptoms of a spasm of coronary arteries, which served as a control, the experiment was repeated during inhalation of nitrous oxide (5 minutes after beginning the inhalation). At the end of the experiments, the position of the electrode was checked by means of electrolytic destruction of the region of irritation with a subsequent histological treatment of the sample. Nitrous oxide in mixtures with oxygen, 1:1, 1.5:1, 2:1, and 2.5:1, prevented the origination of the central spasm of coronary arteries, induced by stimulation of various morphological structures of the reticular formation of the brain. The effectiveness of nitrous oxide depended on its concentration in the mixture, on the type of disturbance of the rhythm of the cardiac activity, on the concomitant coronary deficiency, and on the morphological structure, subjected to stimulation. Nitrous oxide did not prevent the origination of the 'peripheral' spasm of coronary arteries, induced by the introduction of piluitrine.

16600

Sapegin, D. I.

EFFECTS OF CARDIAC GLYCOSIDES ON THE OXYGEN INTAKE AND ITS TENSION IN CEREBRAL AND MUSCLE TISSUES. (Vliyaniye serdechykh glikozidov na postupleniye kisloroda i napryazheniye yego v mozgovoy i myshechnoy tkanyakh). Text in Russian. Farmakol. i Toksikol. (Moscow), 30(3):308-312, May-June 1967. 19 refs.

The effects were studied of solutions of strophanthin (0.05%), convallatoxin (0.03%), erysimine (0.03%), periplocin (0.025%) and cymarine (0.05%), (introduced intravenously during 4 to 6 min in doses of 0.04 ml/kg) on the oxygen intake by the tissues and its tension in the brain and the striated muscles of dogs with hypoxia, induced by intraperitoneal introduction of 40 to 60 mg/kg of nembutal or by intoxication with nitrogen oxides. Nembutal produces a deep narcosis with severe impairment of breathing and cardiac activity; the nitrogen oxides produce toxic emphysema. In the tests, the intake of oxygen by the head tissues was calculated from the arterio-venous difference of oxyhemoglobin and the volume rate of flow of the blood stream in the outer jugular vein. The oxyhemoglobin concentrations in the carotid and the outer jugular vein were recorded by oxyhemographs 036-M by the method of Kisin, while the volume rate of flow of the blood stream in the outer jugular vein was recorded by the pump-flowmeter of Kisin and Tsaturov. The oxygen tensions in the cortex and the subcortex of the temporal section of the brain, and in the muscles of the tongue were determined polarographically using Epstein electrodes. The depolarization current was recorded by the oxyhemograph. The external breathing was recorded by a pneumograph; the pressure in the carotid, by a mercury manometer. Strophanthene, convallatoxin, erysimine, periplocin and cymarine introduced, in the pressure of hypoxia, increase the oxygen absorption by the tissues of the head and the oxygen tension in the skeletal muscles. The oxygen tension in the brain is increased to a lesser degree than in the muscles and actually decreased by them. The most pronounced changes were found to be caused by strophamthene and convallatoxin; somewhat less obvious ones were observed by erysimine, and quite insignificant ones, by periplocin. The effect of cymarine was erratic.

17027

Yokoyama, Eiji

UPTAKE OF SO2 AND NO2 BY THE ISOLATED UPPER AIRWAYS. Koshu Eiseiin Kenkyu Hokoku (Bulletin of the Institute of Public Health), 17(4):302-306, 1968. 9 refs.

The penetration rates of sulfur dioxide and nitrogen dioxide in the respiratory system were studied by isolating the upper airways of two dogs and three rabbits anesthetized with intravenous pentobarbital sodium. The airway of nose, pharynx, larynx, and the uppermost trachea were isolated from the remainder of the respiratory system by fitting a glass mask to an animal's head. The mask was connected to a glass cannula through which the gases were sucked in for 10-15 min. The rate of uptake was found to be nearly constant during the period of gas passing and 99.7% for 7-87 ppm SO2 and 4-41% ppm, NO2. The differences in the rate of uptake may partly explain the different responses in the ventilatory functions of experimental animals exposed to SO2 and NO2. (Author abstract modified)

17055

Yokoyama, Eiji

EFFECT OF EXPOSURE TO THE MIXTURE OF SO2 AND NO2 ON VENTILATORY FUNCTIONS OF GUINEA PIGS. Koshu Eiseiin Kenkyu Hokoku (Bulletin of the Institute of Public Health), 17(4):315-321, 1968. 13 refs.

Six quinea pigs, 280 g-440 g in body weight, were exposed to mixtures containing 18 ppm sulfur dioxide-17 ppm nitrogen dioxide and 37 ppm SO2-32 ppm NO2 and studied for the effects of exposure on their ventilatory function (flow resistance of the lung plus thorax, tidal volume, and respiratory rate). No significant changes were observed in either respiratory rate or tidal volume. In general, the time course of respiratory rate and tidal volume changes was midway between that caused by exposure to the individual gases, which brought about statistically significant percent changes. The results are discussed in terms of complicated interactions between flow resistance, compliance, and lung air volume. It is hypothesized that SO2 and NO2 in combination exert their action independently at different lung sites, with changes in flow resistance determined chiefly by the component SO2. Below a certain level, a mixture may cause fewer overall changes than individual gases. Beyond a certain level, a mixture may become lethal in short intervals of exposure. As a result of exposure to 50 ppm SO2-50 ppm NO2, all animals died from pulmonary hemorrhage. None had died during exposure to 50 ppm SO2 or NO2 alone. (Author abstract modified)

17056

Yokoyama, Eiji

COMPARISON OF THE VENTILATORY EFFECTS ON GUINEA PIGS OF EXPOSURE TO SO2 AND NO2. Koshu Eiseiin Kenkyu Hokoku (Bulletin of the Institute of Public Health), 17(4):307-314, 1968. 26 refs.

Quantitative measurements of ventilatory function of guinea pigs were made before, during, and after two-hr exposure to 6 to 90 ppm of sulfur dioxide and 6 to 57 ppm of nitrogen dioxide. A significant increase in the respiratory (lungs plus thorax) flow resistance was caused by exposure to both gases; the rate of increase was generally higher for SO2 than for NO2. However, the direction of respiratory rate response was quite different at concentrations above 6 ppm; it decreased following SO2 exposure and increased following NO2 exposure. A similar pattern was observed for tidal volume response. Five of the 15 guinea pigs exposed to 57 ppm of NO2 died from lung hemorrhage within 48 hrs after exposure. It is suggested that the differences in the ventilatory effects of SO2 and NO2 are due to the gases reaching different areas of the lungs. Within the range of concentrations studied, it appears that NO2 penetrates deep into the lungs, causing a decrease in compliance and a smaller increase in flow resistance. Sulfur dioxide, being taken up by the mucosa of the airway before reaching the peripheral portion of the lungs, could cause increased flow resistance without a significant change in compliance. (Author abstract modified)

17061

Yokoyama, Eiji

EFFECTS OF ACUTE CONTROLLED EXPOSURE TO NO2 ON MECHANICS OF BREATHING IN HEALTHY SUBJECTS. Koshu Eiseiin Kenkyu Hokoku (Bulletin of the Institute of Public Health), 17(4):337-346, 1968. 34 refs.

The effect of short term exposure to 2.7, 6.2, 12.6, and 16.9 ppm concentrations of nitrogen dioxide on the mechanics of breathing was studied in eight healthy males from 18 to 37 years of age. The subjects were seated in a volume-displacement body plethysmograph and exposed to each concentration for 10 min. Pulmonary flow resistance, pulmonary compliance, and functional residual capacity was measured before, during, and after each exposure period. No subject showed a significant change in flow resistance after exposure to 2.7 ppm; the average increase in flow resistance became significant only at 16.9 ppm. Recovery of the average flow resistance observed at 16.9 ppm was essentially complete 10 min after exposure ended. Combined data on 16.9 and 12.6 ppm exposures showed that the significant increase in flow resistance occurred within 5 min of the onset of exposure. No subject showed a significant reduction in pulmonary compliance. Similarly, functional residual capacity, respiratory rate, tidal volume, and pulse rate were found to be unaffected by all concentrations. Atropine, 0.7 mg in dose, administered subcutaneously prior to exposure did not inhibit the increase of flow resistance. No difference was found between response to NO2 alone or in combination with a submicronic NaCl aerosol. (Author abstract modified)

17079

Jonek, J., G. Jonderko, and A. Pacholek

HISTOCHEMICAL STUDIES OF KIDNEYS WITH CHRONIC MANGANESE POISONING. (Histochemische Nierenuntersuchungen nach chronischer Manganvergiftung). Intern. Arch. Gewerbepathol. Gewerbehyg. (Heidelberg), vol. 21:347-361, 1965. 23 refs. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 22p., June 1969.

Histochemical studies were conducted on the activity and the distribution of enzymes in the kidneys of rabbits with chronic manganese poisoning. The test rabbits received 1 mg of manganese per kg of body weight in a 1% solution of MnCl2.H2O in 0.15 M solution of NaCl every other day. This dose was injected intravenously over a period of 68 days. The histochemical examinations yielded a decrease in the activity of respiratory enzymes along with a simultaneous change in the mitochondria. It was concluded that there are disorders of the respiratory enzyme chain phophorylation. The observed reduction of activity of the alkaline phosphatase along with an enzyme diffusion into the interior of the cytoplasm indicates malfunctioning resorptions and degeneration processes in the kidneys. Chronic manganese intoxication causes a general reduction of the activity of the adenosinetriphosphatase in the nephrons, which leads to a back resorption of sodium and potassium into the kidneys. The acid phosphatase and the acid desoxyribonuclease show a reaction increase with a simultaneous enlargement of the lysosomes leaving a diffuse reaction product. This indicated a degeneration or a higher pinocytosis caused by the toxic amounts of manganese. The unspecific esterases show a reaction increase which pointed to disorders of the fat metabolism. An unchanged activity of the leucine-aminopeptidase indicated that the albumin metabolism is little affected by the toxic manganese concentrations. Different changes in the enxyme activity found in the individual rabbits indicated that each animal reacts differently. (Author summary modified)

17080

Jonek, J., G. Jonderko, and M. Krauze

HISTOCHEMICAL STUDIES OF THE DISTRIBUTION AND ACTIVITY OF THE 5-NUCLEOTIDASE, ADENOSINETRIPHOSPHATASE, ACID PHOSPHATASE, ACID DESOXYRIBONUCLEASE, ALKALINE PHOSPHATASE AND OF THE UNSPECIFIC ESTERASES IN THE LIVER AFTER EXPERIMENTALLY-INDUCED MANGANESE POISONING. (Histochemische Untersuchungen ueber die Lokalisation und Aktivitat der 5-Nukleotidase, Adenosintriphosphatase, sauren Phosphatase sauren Desoxyribonuclease, alkalischen Phosphatase und der unspezifischen Esterasen in der Leber bei experimenteller Manganvergiftung). Intern. Arch. Gewerbepathol. Gewerbehyg. (Heidelberg), vol. 21:241-245, 1965. 17 refs. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 20p., June 27, 1969. Histochemical studies were conducted on the activity and distribution of enzymes in the liver of rabbits after poisoning with manganese. Seven male rabbits more than 6 months old and weighing between 2.5 and 30 kg, received 3.5 mg manganese per kg of body weight daily in a 1% solution as $MnCl_2.4H_2O$ in 0.15 M solution of NaCl for 32 days. Injections were given in the marginal vein in the ear. The studies showed that the activities of adenosinetriphosphatase and alkaline phosphatase increased. The 5-nucleotidase and the desoxyribonuclease showed an individual reduction of their activity. The acid phosphatase and the unspecific esterases increased their activity. The activity increase of acid phosphatase and the occurrence of coarse and diffuse reaction products may indicate degeneration processes in the cytoplasm. The enzymatic changes were linked with disorders of the metabolism. (Author summary modified)

17081

Jonek, J. and G. Jonderko

HISTOCHEMICAL STUDIES OF THE BEHAVIOR OF LEUCINE-AMINOPEPTIDASE IN STRIATED MUSCLES AND IN THE LIVER AFTER ACUTE MANGANESE POISONING. (Histochemische Untersuchungen ueber das Verhalten der Leucin- Amino-Peptidase im quergestreiften Muskel und in der Leber nach akuter Manganvergiftung). Z. Mikroskop. Anat. Forsch., vol. 72:417-425, 1965. 16 refs. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 16p., June 27, 1969. Histochemical studies of the properties of the leucine-amino-peptidase in striated muscle fibers and in the liver of 7 rabbits poisoned with manganese were performed. The rabbits received 3.5 mg manganese per kg of body weight daily in a 1% solution as $MnCl_2.4H_2O$ in a 0.15 M solution of NaCl for 32 days. The solution was injected into the marginal vein of the ear. The control group consisted of 6 rabbits. In rabbits intoxicated with manganese, an obvious increase of the leucine-amino-peptidase activity was noted in the muscle fibers. In the gland cells of the liver, a decrease in the activity of this enzyme was observed. In the periphery of the liver lobulae and in the connective tissue, the enzyme reaction was higher than in the control animals. It was difficult to interpret the results. The increase in the intensity of the leucine-amino-peptidase activity in the muscle tissue could be due to a direct effect of the manganese ions on this enzyme since they are activators of enzymes. It was hypothesized that manganese poisoning causes the excretion of the leucine-amino-peptidase into the plasma.

17311

Yokoyama, Eiji

COMPARISON OF THE VENTILATORY EFFECTS OF SO_2 AND NO_2 - EXPOSURE OF HUMAN VOLUNTEERS. (SO_2 oyobi NO_2 no kankino ni oyobosu eikyo no hikaku - hito shigansha ni okeru bakuro jikken). Text in Japanese. Sangyo Igaku (Jap. J. Ind. Health), 12(1):4-8, Jan. 20, 1970. 20 refs.

Respiratory mechanisms were studied in eight healthy male volunteers during and following exposure to 36 ppm sulfur dioxide or 15 ppm nitrogen dioxide. An esophagus balloon was inserted through the nose of each subject who was seated in a body plethysmograph. A Dubois pressure type plethysmograph was employed for SO_2 exposure, and a Mead variable volume type 7l- Krogh spirometer for NO_2 exposure. In both cases, the mean value of the pulmonary flow resistance increased significantly at the end of the exposure. No significant difference was observed in other measures of respiratory mechanisms except for one subject, no difference was seen between responses to SO_2 and NO_2. Additional groups of subjects were exposed to SO_2 and NO_2 with or without pre-treatment with atropine sulfate. The atropine markedly inhibited the increase in the pulmonary flow resistance during exposure to SO_2, but not during exposure to NO_2. The result suggests, as regards the cause of airway narrowing, that reflex bronchoconstriction plays a role in the exposure to SO_2, while other mechanisms are also involved in the case of NO_2.

17417

Safronov, V. A.

CLINICAL ASPECTS AND TREATMENT OF TOXIC PNEUMONIA CAUSED BY EFFECTS OF NITROGEN OXIDES. (Klinika i lecheniye toksicheskikh pnevmoniy vyzyvayemykh vozdeystviyem okislov azota). Text in Russian. Voenno-Med. Zh. no. 2:28-34, Feb. 1967. 8 refs.

Symptoms of pneumonia brought on by nitrogen oxide poisoning are described in detail. Two case histories are reported. Distinctions between toxic pneumonia and toxic bronchitis are stressed. Both first-aid and long-term treatment to combat poisoning, hypoxia, infection, and brochospasm are discussed.

17590

Kireev, V. I.

COMPARATIVE CHARACTERISTICS OF THE PATHOGENICITY OF MINE DUST OF MIXED COMPOSI-

TION. (Sravnitel' naia kharakteristika patogennosti rudnichnoi pyli smeshannogo sostava). Gigiena Truda i Prof. Zabolevaniya, vol 10:14-20, April 1966. 12 refs. Translated from Russian. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 14p., July 18, 1969.

The pathological effects produced by 4 samples of mine dust of mixed composition and 1 sample of crystalling quartz (the control) were experimentally determined. The dust was introduced intratracheally to 120 albino rats. The test results showed that the development of silicosis depends not only upon the silico content, but also on the other chemical compounds which also compose the dust. A nodular form of silicosis, distinguished by the appearance of typical silicotic nodules, developed with mine dust containing 24% free SiO_2 and other chemical compounds. Pneumoconiosis of the silicosiderosis type developed with mine dust containing 12% free SiO_2, 17.7% Fe_2O_3, and other chemical compounds. Mine dust comprising 1.6% free SiO_2, 12.8% Fe_2O_3, and other chemical compounds caused the development of diffuse pneumosclerosis without typical silicotic nodules, but with the formation of minute cellular-dust foci, of the siderotic type. In mine dust containing large amounts of tungsten trioxide, but no free SiO_2, a weakly pronounced diffuse pneumosclerrosis developed as well as the formation of cellular-dust foci without any pronounced histiocytic reaction around them. All of this was accompanied by a diffuse interstitial inflammatory process and by purulent bronchitis. (Author summary modified)

17683

Ternisien, M. Jean A.

POLLUTION AND 'NUISANCE' PROBLEMS OF INDUSTRIAL AND URBAN ORIGIN. THEIR PREVENTION IN THE PRINCIPAL COUNTRIES AND THE SCIENTIFIC, TECHNICAL, LEGISLATIVE, AND REGULATORY PROBLEMS WHICH THEY PRESENT TO INTERNATIONAL EXPERTS. (Les pollution et 'nuisances' d'origine industrielle et urbaine. Leur prevention dans les principaux pays et les problems scientifiques, techniques, legislatifs et reglementaires qu'elle pose aux experts internationaux). vol. 2, Paris, La Documentation, Francaise, Dec. 1967, 259p. 115 refs. Translated from French. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 535p., May 20, 1969. The services in the foreign embassies in Paris, intergovernment organizations, and international associations that deal with these problems. The dangers created by pollution and 'nuisance' problems which are urban or industrial in origin are a direct function of the rapid growth of the world population, and scientific and technical progress. On the international level the technical and regulatory actions which are to be introduced in common in a number of countries must be defined. The work is in four chapters: (1) a contribution to the study of pathologic effects produced in man and in his foodstuffs by inhaled and ingested pollutants and by acoustic 'nuisances'; (2) international standardization of analysis and measurement methods directed to characterizing inhaled and ingested polluted media and injurious acoustic media; (3) technical prevention of pollution of inhaled and ingested mediums and of acoustic nuisances; and (4) essential ordinances and trends as drawn from the laws and statutes of the major countries and prospects of an intergovernmental organization of the regulations. A summary table of the principal intergovernmental organs and international associations that are concerned with prevention of pollution and 'nuisances' is appended. It is concluded that epidemological research, international standardization, improvement of prevention techniques, and establishment of international conventions or charters are the main directions of the effort which must be followed jointly by the most developed countries within the framework of intergovernmental organizations, with the help of specialized international associations. But, to be effective, the application of the recommendations and international standards rests with the decisions of the governments which are sincerely aware of the increasing danger that threatens them if appropriate measures are not taken.

19514

Fujino, T., K, Yoshida, K. Miyachi, M. Yoshii, H. Oshima, and M. Imai

STUDY OF MANAGEMENT SYSTEM OF RESPIRATORY DISEASES FROM AIR POLLUTION. (Taikiosen niyoru kokyuki shikkan no kanrihoshiki ni kansuru kenkyu). Text in Japanese. Sangyo Igaku Kenkyusho Gyosekishu (Report Inst. Ind. Med.), no. 3:1-47, June 1, 1969.

The results of a 2-yr medical survey which was conducted to study the relationship between air pollution and respiratory disease in three polluted areas of Yokkaichi City are presented in the form of tables and graphs. The data demonstrate the effect of air pollution on humans, especially with respect to respiratory diseases. The contents are divided into two categories: one concerned with epidemiological aspects of the Yokkaichi type of air pollution, of which the major constituent is sulfur dioxide, and one concerned with clinical hematological studies. Significant findings are that the highest death rate from respiratory disease occurred in the most heavily polluted area of Yokkaichi and that the death rate has tended to increase since the advent of a petrochemical plant. It is concluded that most cases of chronic nonspecific bronchitis are related to bronchus asthma, and that cases of lung emphysema have developed from bronchus asthma rather than chronic bronchitis.

19553

Sklensky, Bohuslav

INDICENCE OF PNEUMOCONIOSIS IN THE ROSICE-OSLAVANY COAL MINES (RUD) AND FACTORS LEADING TO ITS QUICK DEVELOPMENT. Prakt. Lekar. (Prague), 19(3):97-102, 1967. 12 refs. Translated from Czech. National Institutes of Health, Bethesda, Md., Translating Unit, 10p., July 7, 1969.

From the data concerning 243 miners of the Rosice-Oslavany coal mines who had various forms of pneumoconiosis, the average time for the development of rtg-reticulation was 17.1 years for the mining work. The average time for the total underground work was 21.5 years. For all forms of pneumoconiosis, the average time in mining was 17.2 years, and the average time of underground exposure was 22.6 years. After 5.5 years of mining, 5% of the rtg-reticulation developed. It was estimated that 34 miners were endangered yearly by pneumoconiosis. It is recommended that miners be transferred to less dusty work sites after 17 years of mining, although it would be more proper to transfer the miners after only 5.5 years of the mining work. This requirement would meet great resistance because of the shortage of qualified miners and also in view of the fact that as a result of successful measures of the dust control commission, the dust level in RUD has been reduced more than 10 times since 1963. As long as the dust level in mining exceeds the permissible concentration, however, it is the responsibility of all health authorities to enforce a timely transfer of miners. The period of 5.5 years has another significant practical importance since it can be used for factual evaluation of the dust control measures. Several secondary factors were statistically significant in the development of pneumoconiosis among young miners, including overtime work, unqualified management of the homes of young miners, nutritional deficiencies, neglect of sports activities, and past inflammatory lung diseases. (Author summary modified)

19558

Dalquen, P., A. F. Dabbert, and I. Hinz

ON THE EPIDEMIOLOGY OF THE PLEURAMESOTHELIOMA. PRELIMINARY REPORT ON 119 CASES FROM THE HAMBURG AREA. Praxis Pneumol., 23(8):548-558, Aug. 1969. 17 refs. Translated from German. Belov and Associates, Denver, Colorado.

The epidemiology of 119 cases of pleuramesothelioma, a rare malignant tumor, was studied in Hamburg with its asbestos and wharf industry. An analysis of the case material revealed an increased incidence of pleural mesothelioma in Bergedorf, a district of Hamburg where an asbestos works was located. The role of occupational, residential, and domiciliary exposure to asbestos in the development of the tumor is discussed. The importance of obtaining detailed records is stressed, since asbestos exposure may occur in a great variety of occupations. The average interval between the first exposure and development of the tumor was 35.2 years. Exposure to asbestos was definitely established in 17 cases and was likely 34 cases, but in 64 cases evidence of exposure was lacking or tenuous. (Author abstract modified)

19880

Balazova, G. and A. Rippel

A STUDY OF HEALTH CONDITIONS OF THE POPULATION LIVING IN THE VICINITY OF AN ALUMINUM FACTORY. (Studio sulle condizioni di salute della popolazione abitante nelle vicinanze di una fabbrica di alluminio). Med. Lavoro (Milan), 59(5):376-380, 1968. 4 refs. Translated from Italian. Belov and Associates, Denver, Colo., 6p., Jan. 27, 1970.

The health conditions of children living near an aluminum factory were studied. The ambient pollution from fluorine emitted by the factory was very high. High fluorine values were found in the agricultural products of the areas near the factory. In the children examined, the absorption of fluorine by the digestive and respiratory systems was approximately 2.15 mg/day. The children showed a marked increase in the fluorine content in their teeth, hair, nails, and urine when compared with children living in a non-polluted area. Clinical and laboratory studies revealed a moderate decrease in hemoglobin values and an increase in the red blood cell count in children exposed to a high absorption of fluorine. When some of the children were transferred to a non-polluted zone, the urinary excretion of fluorine decreased by 40% after one month. It may, therefore, be assumed that the accumulation of fluorine is reversible. (Author summary modified)

19939

Umezawa, T.

AIR POLLUTION AND BLOOD GAS. (Taiki osen to ketsueki gasu). Text in Japanese. Naika, 21(5):836-840, May 1968.

Chemical substances as air pollutants are carbon fly ash, sulfur dioxide, sulfur trioxide, hydrogen sulfide, nitric oxide, nitrogen dioxide, ammonia, ozone, carbon monoxide, carbon dioxide, hydrogen fluoride, hydrogen chloride, aldehydes, carbon hydrates, tar, radioactive gases, aerosols, etc. Gas poisoning cases reported in Japan during a 2-year period between 1956 and 1957 were as follows: CO, 126; NO2, 45; SO2, 45; H2S, 12; CN, 11; and CS2, 7. SO2 and CO are the most important air pollutants observed within the exhaust gas of factories and automobiles, respectively. CO enters the human body only through respiratory organs, and SO2 through both respiratory and digestive organs. Discomfort occurs when the CO concentration is 1000 to 1200 ppm (after 1 hour's inspiration) or when CO toxicity ratio (ppm x hour) is more than 600. Mortality may occur when CO concentration is 1500 to 2000 ppm (after 1 hour's inspiration) or when CO toxicity ratio is more than 1500, or when carboxyhemoglobin concentration is 60 to 80%. CO concentration in the ambient air is not always parallel to COHb concentration in the blood, and the latter is influenced by age, sex, condition of health, smoking, or residence. Symptoms of CO toxicity were shown. Harmful effects of SO2 on human bodies are irritation, especially to mucosal membranes, (eyes, respiratory tract, esophagus, stomach, etc.), and acidosis due to the decrease of alkaline reserve within the blood due to H2SO3, causing disturbances of bone growth in children or myocardial degeneration in adults.

19947

Mautner, Bedrich

BCG-INOCULATION AND BITUMINOUS COAL PNEUMOCONIOSIS. Intern. Arch. Gewerbepathol. Gewerbehyg. (Heidelberg), vol. 23:347-357, 1967. 11 refs. Translated from German. National Institutes of Health, Bethesda, Md., Translating Unit, 13p., July 17, 1969.

Two groups of miners from the Ostrava-Karwin bituminous coal area in Czechoslovakia were observed to determine the danger of developing pneumoconiosis. Variations in dust exposure, according to different mines and types of underground work, were noted. To avoid this source of error in estimating the danger from dust exposure in the two groups, a dust exposure coefficient was introduced, based on the health conditions of each mine and each work area. Tuberculosis was found in 2.7% of those inoculated with B. Calmette-Guerin (BCG) in comparison with 4.6% in the non-inoculated group. This confirms the fact that BCG inoculation provides protection from tuberculosis in bituminous coal miners. In comparison with 15.5% of inoculated persons, 35.9% of non-inoculated persons developed bituminous coal pneumoconiosis. A similar result was found when comparing the frequency of pneumoconiosis in relation to the duration and degree of dust exposure. Among coal diggers, in those inoculated with BCG, pneumoconiosis was found in 31.3% of the cases; among the non-inoculated, the figure was 58.5%. When the BCG-inoculated group was subdivided according to time of inoculation, the pneumoconiosis frequency among those inoculated during dust exposure was 20.5%; in those inoculated before starting underground work, the figure was 12.1%. (Author summary modified)

20972

Starodubova, T. F.

MANGANESE BALANCE IN PUPILS OF A BOARDING SCHOOL UNDER CONDITIONS OF THE PROCESS OF LEARNING AND A SUMMER REST IN A PIONEER CAMP. (Balans margentsa u uchashchikhsya shkoly-internata v usloviyakh uchebnoga protesessa i letnepo otdykha v pionerskom lapere). Vopr. Pitaniya, vol. 27:36-40, July-Aug. 1968. 3 refs. Translated from Russian. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 8p., Sept. 23, 1969.

Manganese balance was studied under conditions prevalent in the steppe area of the Ukraine in five groups of adolescents during the regular process of learning, during examinations, and during summer vacation. Manganese in food rations and excreta was titrated by the persulfate method. The manganese balance was found to be extremely variable, being influenced by individual peculiarities of manganese exchange and sexual differences. But the main factor determining manganese balance was the type of activities pursued by the adolescents. Under regular conditions of learning, the manganese balance in both sexes was positive. During the period of examinations, the level of manganese discharged from the body increased sharply. However, it remained positive in girls who had received high amounts of manganese in their food ration. With boys who had received less manganese in their food, a negative balance was observed. The period of summer rest was characterized by a high level of manganese discharge and a relatively low retention level compared to the regular learning process. It is concluded that adolescents should receive not less than 0.17 to 0.20 mg per day. Based on the average weight of adolescents, the diet of boarding schools in the Ukraine should contain no less than 8.5 to 10.0 mg of manganese.

21087

Mosendz, S. A. and A. I. Silakova

EFFECT OF MANGANOUS CHLORIDE ON NITROGEN METABOLISM. (Vliyaniye khloristogo margantsa na azotistyy obmen). Vopr. Med. Khim., vol. 14:27-31, Jan.-Feb. 1968. 16 refs. Translated from Russian. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 10p., 1969.

The effect of manganous chloride on nitrogen metabolism in rats weighing 200-220 grams was studied. A 10% solution of manganous chloride was administered endotracheally in doses of 20 mg manganese per rat. The animals were decapitated on the 1st, 6th, and 30th day after poisoning. Members of the control group were also killed at the same time. The tissue studied was rapidly removed, frozen in liquid air, and carefully pulverized. The frozen pulverized tissue was suspended and stirred in 5% trichloroacetic acid. Proteins were separated by centrifugation. Intoxication, brought about by single endotracheal administration to rats of 10% manganous chloride solution in doses corresponding to 15 mg of manganese per rat was accompanied by an increase in ammonia content in the blood, brain, liver, and skeletal muscles on the 1st and especially on the 6th day after administration. On the 30th day, the ammonia content in the blood was close to its content in normal animals; in the brain, liver, and skeletal muscles, it remained at a high level. Together with the increase in ammonia content in tissues, there was an intensification of processes directed toward the elimination of its toxic action: an increase in content of free glutamine and of protein amide nitrogen. The most pronounced changes in ammonia metabolism occurred in liver tissue and were somewhat less in brain tissue.

21123

Szostak, W.

THE ROLE OF MAGNESIUM IN THE BODY. (Rola magnezu w ustroju). Polski Tygod. Lekar. (Warsaw), 16(37):1421-1424, 1961. 31 refs. Translated from Polish. 15p.

Magnesium is one of the most important electrolytes in the body, averaging in adults about 25 g (about 43 mg per kg body weight). The tissues contain 98% of the entire amount, with the remaining 2% in extracellular fluids. The daily Mg requirement of the human body is about 220 mg; a normal diet fully covers this requirement. A relatively low amount of the Mg taken in is absorbed, and this only in the small intestine. About 65% of the Mg in blood plasma is totally ionized; this portion penetrates the tissues rather easily compared with the remaining protein-bound 35%. Urinary excretion is the major route of Mg elimination. Mg appears to play a major role in intracellular metabolism; the presence of Mg ions is indispensable for many enzymatic reactions. Some hormonal glands seem to affect its metabolism, although the mechanisms and controlling factors are not known. It does show a high affinity for accumulation in heart muscle. In animals, injection of Mg affects the nervous and neuro-muscular systems, resulting in depression and reduced nervous response, and with large doses, in coma. The change of Mg level in blood serum is a significant finding in certain illnesses, for example chronic alcoholism, liver cirrhosis, uremia, and diabetic acidosis. Descriptions are given of two clinical syndromes of magnesium metabolism: hypomagnesemia and hypermagnesemia. The most convincing symptom of the former is increased irritability of the neuro-muscular system, manifested by tetany attacks in severe cases.

21125

VDI (Verein Deutscher Ingenieure) Kommission Reinhaltung der Luft, Duesseldorf, Germany

PERMISSIBLE CONCENTRATIONS OF NITROUS GASES. (Maximale Immissions- Konzentrationen MIK Nitrose Gase). VDI (Ver. Deut. Ingr.) Richtlinie, no. 2105, May 1960. 24 refs. Translated from German. 9p., 1962.

The Permissible Emission Concentrations, (PEC values) set by VDI are defined as those concentrations of pollutants in layers of the open air close to the ground which may be considered harmless, according to current knowledge, to man, animal, or plant during exposure of a given frequency and duration. These values are valid only within certain ranges, only when the pollutant occurs by itself rather than in mixture with other pollutants, and only for the open air outside of an emitting location. Nitrous gases occur in nature from electric discharges in the atmosphere; technologically, they are produced from such principal sources as the manufacture and processing of nitric acid and from internal combustion engines, explosives, and celluloid. Nitrous gases, which are recognizable by their brown color and characteristic odor, comprise the following nitrogen oxides and their compounds: nitrogen monoxide (NO); dinitrogen trioxide (N2O3); nitrogen dioxide (NO2); and dinitrogen tetroxide (N2O4). The latter two are the primary carriers of the toxic action of nitrous gases. The PEC half-hour mean value set for continuous exposure to NO2 is 0.5 cm3/m3. The PEC for intermittent exposure (permissible excess above the PEC for continuous exposure) is 1.0 cu cm/cu m half-hour mean value, three times daily. In the transition from normal air into an atmosphere containing NO2, the olfactory threshold lies at 0.1 cu cm/cu m (calculated as NO2) and the odor becomes characteristic at 0.5 cu cm/cu m, although within 5-6 min olfactory perception disappears even at 20 cu cm/cu m. Minor symptoms of irritation such as dry and rough throat may occur under prolonged inhalation of 1-2 cu cm/cu m; with repeated exposure, these become less and finally disappear even after inhaling 20 cu cm/cu m for 2 hrs. Toxic effects of nitrous gases on man and animals have not been differentiated; in plants, it appears that even sensitive plants sustain no damage from exposure to a mean concentration of 1 to 2 cu cm/cu m.

21336

Grosser, Peter-Juergen

THE IMPORTANCE OF EPIDEMIOLOGICAL METHODS FOR COMMUNITY HYGIENE DEMONSTRATED AT THE EXAMPLE OF THE HYGIENE OF AIR POLLUTION. (Die Bedeutung epidemiologischer Methoden fuer die Kommunalhygiene, dargestellt am Beispiel der Lufthygiene). Text in German. Wiss. Z Humboldt-Univ. Berlin Math. Naturw. Reihe, 18(1):69-74, 1969. 38 refs.

The concentration of pollutants in the atmosphere is generally low (1 ppm and less). The pollutants are either solid, gaseous, or liquid. They vary qualitatively and quantitatively with time and space, so that long-term measurements are required to obtain an ide of the extent of pollution. Because of this variability, it is difficult to assess the actual danger to humans. The increased mortality during the smog episode in London of 1952 became apparent only weeks after the catastrophe at a routine evaluation. The normal death rate was exceeded by 4000. Study of the life- expectancy of humans revealed that it is sometimes 4 to 5 years les in heavily polluted industrial centers. For instance, in the industrial center of Most (Bohemia), the life-expectancy for men is lower by 4 years than in other Bohemian areas. Study of the mortality rate showed that a close relationship exists between diseases of the respiratory tract and air pollution in general, and smoke and sulfur dioxide specifically. Significant correlations were found between bronchitis and pneumonia and the concentration of smoke and SO2. The German Democratic Republic plans to erect a measurement grid for air quality measurements over the entire Republic. In connection with the study of the health records of various groups of the population, it will be feasible to determine the correlation between air pollution and the health of the population.

21414

Miyachi, Kazuma and Hideo Kashiwagi

AIR POLLUTION AND RESPIRATORY DISEASE OF YAKKAICHI DISTRICT: THE TYPE OF YOKKAICHI ASTHMA. (Yokkaichi chiiki ni okeru taikiosen to kokyuki shikkan: iwayuru Yokkaichizensoku no byokei ni tsuite). Text in Japanese. Sangyo Igaku Kenkyusho Gyosekishu (Report Inst. Ind. Med.), no. 3:69-80, June 1, 1969 25 refs.

The relationship between the Yokkaichi type of asthma and Yokkaichi air pollution, of which the major constituent is sulfur dioxide from petrochemical plants, are discussed, together with characteristics of the pollution and its effects on respiratory organs. It has been widely accepted that lung emphysema develops primarily from simple chronic bronchitis. This theory is contradicted by a Yokkaichi study which grouped patients with respiratory disease into those (group A) who had the disease before the construction of the petrochemical plants and those (group B) who did not develop it until after the plants were in operation. Group A had a higher incidence of lung emphysema than group B, which tended more toward non specific bronchial asthma. The findings are accounted to the difference in the length of exposure to polluted environment by sulfurous acid gas from the plants, namely, non specific bronchial asthma in group A developed into lung emphysema after more than eight years of exposure. The fact that more bronchial asthma was found in group B underlines the high probability of the group passing through the same process as group A. This type of process is construed to be distinctively representative of the effect of Yokkaichi air pollution. It is concluded that chronic bronchitis is not predominantly responsible for lung emphysema where Yokkachi type air pollution exists.

21644

Rijnmond Public Agency (Netherlands), Task Group on Standards for Air Pollution

PROVISIONAL REPORT OF THE MAXIMUM ADMISSIBLE POLLUTION OF THE OUT- SIDE AIR WITH SO2 IN THE AREA OF RIJNMOND. 1969 (?). Translated from Dutch. Belov and Associates, Denver, Colo., 7p., April 15, 1970.

Recommendations are made for maximum emission concentrations (MIC values) for sulfur dioxide in the area of Rijnmond in The Netherlands. The proposed MIC value for a 24-hr average is 500 micrograms/cu m; the annual average concentration should be below 150 micrograms/cu m. These values are based on epidemiological data from the international literature, and take into account acute, subacute, and chronic exposure situations. The known effects of various concentrations of SO2 on humans, animals, plants, and materials are briefly noted; the subacute effect on humans during 1-3 day exposures consists of exacerbation in the condition of persons already having some health impairment. SO2 may be primarily an indicator pollutant, with harmful effects arising from the presence of other substances, e.g., sulfuric acid. The proposed MIC values will be revised as new data become available.

21669

Mitina, L. S.

THE COMBINED EFFECTS OF SMALL CONCENTRATIONS OF NITROGEN OXIDE AND SULFUR DIOXIDE UPON AN ORGANISM. Gigiena i Sanit., vol. 27:3-8, Oct. 1962. Translated from Russian by Irene B. Sharenbroch, California State Dept. of Public Health, Berkeley, Air and Industrial Hygiene Lab., 10p., Feb. 11, 1963.

A study of the combined effect of small concentrations of nitrogen dioxide and sulfur dioxide on an organism, and the character of their combined action at these concentrations, is discussed. The combined effects of NO2 and SO2 were studied by the chronic exposure of rabbits. Also, the effects of the isolated actions of these gases at the same concentrations were studied. During the exposure and recovery period, the changes in the blood periphery and the state of phagocytic activity were studied, and deformations of the proteinatious fractions of blood serum were determined. At the completion of an experiment, pathomorphological examinations of the respiratory organs were made. A mixture of NO2 and SO2 did not cause any weight reduction. Each isolated gas caused a decrease in the hemoglobin content at the end of chronic exposure, but this effect was not observed with exposure to a mixture of the two. The action of NO2 lead to a decrease in the number of erythrocytes, while a mixture of the gases and the action of SO2 alone did not. The combined action of the gases caused some decrease in the phagocytic activity of the blood; the isolated action of NO2 and SO2 produced a considerable reduction of it. Modifications of the protein fractions of blood were not observed upon inhalation of an NO2-SO2 mixture. A mixture of NO2 and SO2 at the Maximum Allowable Concentration levels for industrial installations adversely affected the animal.

21785

Hitosugi, M.

AN EPIDEMIOLOGICAL SURVEY ON THE EFFECTS OF AIR POLLUTION IN TOKYO METROPOLITAN AREA. (Tokyo-to taiki osen jintai eikyo ekigaku chosa han). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 4(1):45, 1969. (Presented to the Japan Soc. Air Pollution, 10th Annu. Meet., 1969.)

Chronic influences of air pollution on people were studied in the Tokyo metropolitan area from 1966 to 1968, mainly in October. Examinees totaled 6718 and included 5096 males and 1628 females. Little difference was shown between their places of birth, living and employment. The survey comprised an interview using question-and-answer cards, pulmonary ventilation tests, and a sputum examination. The metropolitan area was divided into 3 areas according to the severity of air pollution due to sulfur dioxide: the severely polluted area had a 0.05 ppm SO2 concentration; moderately polluted area had a

SO2 concentration of 0.03 to 0.04 ppm; and the slightly polluted area had less than 0.02 ppm SO2. Morbidity with chronic bronchitis was observed in 5.9% and 3.1% of male and female examinees, respectively. Higher morbidity was noted in elderly males or people from more significantly polluted areas. Severe respiratory symptoms, persistent cough and phlegm with repeated exacerbations, or persistent cough and phlegm with reduced pulmonary function were more frequently seen in these groups.

22152

Coin, Louis

DETECTION AND EPIDEMIOLOGY OF ATMOSPHERIC POLLUTION DUE TO DOMESTIC HEATING PLANTS IN PARIS. (Detection et epidemiologie de la pollution atmospherique due au chauffage des locaux a Paris). Text in French. Pollut. Atmos. (Paris), vol. 12:33-42, May 1970.

A review of the activities of the Laboratory for hygiene of the City of Paris in the fields of air pollution and mortality statistics since the year 1874 to the present time, is presented. Early work related to pollution of city air by germs of various diseases and its correlation with increased incidence of these diseases. In 1900, the effect of travel in congested metro trains on the propagation of tuberculosis was scrutinized. Systematic air-pollution measurements in a network of air-sampling stations were begun in 1957 as a result of the notorious smog disaster in London in 1952. On the basis of data collected in 1957 and 1958, it was estimated that about 52% of the air pollution by sulfur dioxide in Paris was due to domestic heating plants numbering about 20,000. Information is presented on graphic representation of air pollution data by spots of different colors and diameters located at the sampling-station sites, by iso-pollution curves, by echinograms and by iso-exposure time, required for certain toxic effects to become manifest. A time sequence of an iso-exposure time graph is shown. The idea of using the absenteeism of kindergarten-age children as an indicator of the effect of air pollution on the health of a segment of the population is mentioned. A very sensitive indicator of the biological effects of air pollution is deformation of the cell structure in a cytotoxic atmosphere, a technique originated (in 1964) and developed by the Laboratory of Hygiene of the City of Paris.

22317

Petrilli, Fernando Luigi and Guiseppe Agnese

INVESTIGATIONS ON THE RELATIONS BETWEEN DISEASES OF THE RESPIRATORY TRACT AND AIR POLLUTION. (Richerche sui rapporti tra mallattie dell 'apparato respiratorio ed inquinamenti atmosferici). Giorn. Igiene Med. Prevent. (Genoa), vol. 3:255-289, 1962. Translated from Italian. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 49p., Nov. 6, 1969.

Direct determinations were made in four zones in Genoa, Italy different in air pollution by means of a questionnaire, to determine the frequency of respiratory diseases in subjects over 64 years of age. After considering the possible influence of age, length of residence, heart conditions, living habits, and previous work activities, the percentage frequency indices of coughing, expectoration, rhinitis, dyspnea, and recent and remote respiratory diseases were calculated. The more important comparisons were those relating to female subjects. A correlation was found between the incidence of respiratory symptoms and diseases and the extent of air pollution. Lower indices were found for the data determined in the less polluted residential area, especially the frequency of coughing, expectoration, dyspnea, rhinitis, and previous history of bronchitis. A greater mean duration of symptoms and a more frequent summer persistance were found in the more polluted zones. Differences in the frequency of coughing and expectoration, and rhinitis persisting in the summer were found between the industrial and non-industrial zones. The quantity of suspended dust and the sulfur dioxide concentration among the various air pollution indices were well correlated with the data on the frequency of respiratory diseases. Investigations conducted on male groups confirmed the results relating to women, and showed a greater frequency of the cough-expectoration combination and recent respiratory disease among smokers. (Author summary modified)

22426

Ordonez, Blanca Raquel

EPIDEMIOLOGICAL ASPECTS OF AIR POLLUTION. (Aspectos epidemiologico de la contaminacion atmosferica). Text in Spanish. Gac. Med. Mex., 100(3):266-279, March 1970. 34 refs.

The tools of epidemiology are applied to the study of relationships between pollution and health problems, with special attention to Mexico City and the Distrito Federal. Illnesses resulting from dramatic incidents of pollution where permissible limits are exceeded are relatively easy to study. More difficult to assess ar the alleged connections between such diseases as chronic bronchitis emphysema, and primary cancer of lungs and a long-term exposure to pollution at lower concentrations. The most serious pollution problem areas in Mexico, outside the metropolitan area of Mexico City, are Guadalajara, Monterrey, and Tepic. Since 1967 the Mexican Department of Health has been setting up stations for continuous sampling in the area around the capital (Valle de Mexico), where particulate matter, sulfur dioxide, and total sulfur content of the atmosphere can be determined. A study conducted by the Pan American Bureau of Health (OSP) July 1967 - June 1968 makes possible a comparison of pollution measurements in the Mexico City area with those of other Latin American cities. Dust measurements indicate that Mexico has the most serious problems of any of the countries in the group studied (Argentina, Brazil, Colombia, Chile, Peru). In the case of Chile (Santiago) and Argentina (Buenous Aires), the factors created by a temperate climate (which introduces the problem of domestic heating) makes comparison difficult. Average values for Mexico City from October 1967 to June 1968 were 158.2 micrograms/cu m while from November 1968 to October 1969 the amount had been reduced to 131.8 microgram Both of these figures were higher than those obtained in London and in the United States. Mexico City also has the highest sulfur dioxide rate for Latin America. Measurements from October 1967 to June 1968 showed an annual average of 95 micrograms/cu m for Mexico City, and 133 micrograms from November 1968 to October 1969, while during the same period the figure for New York City was from 560 to 840 micrograms. Acute respiratory illnesses decreased by 29.4% in urban areas outside the Distrito Federal between 1964 and 1968, and by 23.5% in rural areas, while in the Distrito Federal there was an 18.7% increase. Chronic bronchitis, emphysema, and asthma showed increased in all areas: 12.7% in urban Mexico 18.9% in rural areas 34.8% in the Distrito Federal.

22953

Mautner, Bedrich

ORGANIZED TRANSFERS OF MINERS AS PRECAUTION IN CONTROL OF PNEUMOCONIOSIS. Pracovni Lekar. (Prague), 19(2):74-78, 1967. Translated from Czech. by J. Chapin, National Institutes of Health, Bethesda, Md., Translating Unit, 10p., July 10, 1969.

Experiences in the organized replacement of miners to control pneumoconiosis in the Ostrava-Karvina region are presented. The mine workplaces are classified by law into four hazard categories according to the hygienic conditions and results of dust concentration measurements. The dust rate is estimated gravimetrically by sampling on Soxhlet filters. To prevent aggravation of pneumoconiosis, the organized replacement to less hazardous areas is carried out when the disease is revealed. This replacement is also effected in the case of healthy miners, to prevent the development of the disease. These cases concern workers younger than 21 years who have exceeded the maximum exposur time and workers with X-rays corresponding to group Z of the international classification of pneumoconiosis. The maximum exposure time, after which the miner should be transferred, is determined in each plant according to the hazards of the mine and the pneumoconiosis rate. It is expected that the preventive replacement of miners will reduce the rate of new diseases and reduce aggravations of existing pneumoconiosis cases. (Author summary modified)

22962

Rosmanith, J. and C. Losert

RELATIONSHIP BETWEEN THE TYPE OF WORKPLACE AND OCCUPATION AND THE DEVELOPMENT OF PNEUMOCONIOSIS IN COAL MINERS. Pracovni Lekar. (Prague), 19(4):159-163. 19 refs. Translated from Czech by J. Chapin, National Institutes of Health, Bethesda, Md., Translating Unit, 10p., July 9, 1969.

The rate of pneumoconiosis development, in relation to the type of work-place and occupation, was observed in 1132 coal miners up to 6 to 10 years after the initial form of the disease appeared. The rate of development was quickest in the miners engaged in the actual mining of coal, slower among the cutters, and slowest among those whose work alternated between mining and cutting. To retard the development of pneumoconiosis, work in the mines must be stopped after a finding of reticulation. If the miner stops working in the mines only after a diagnosis of general nodulation, further developement of the disease will not be prevented. The more advanced the stage of pneumoconiosis at the time of transfer, the higher is the frequency of the complicated form of the disease. No relationship was found between age and pneumoconiosis development. The prevention of pneumoconiosis among miners requires a transfer from the most hazardous occupations before the reticulation diagnosis is made. (Author conclusions modified)

23101

Tokuda, Ryohei and Taku Hashimoto

CHRONIC DISEASES OF RESPIRATORY SYSTEM IN THE AIR POLLUTED AREA OF KAWASAKI CITY. (Kawasaki shi no taikiosen chiku ni oleru manseikokyuki shikkan chosa). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 4(1):46, 1969. (Proceedings of the Japan Society of Air Pollution 10th, Annual Meeting, 1969.)

Kawasaki has about 38 industrial establishments that produce much sulfur dioxide emission, and most of them are situated along the southeastern sea coast. This area was defined as a high-pollution area, and the rest of the city was divided into intermediate, light and non-polluted sectors. Out of the population of about nine million, 300,000 live in the high-pollution area. In a series of preliminary investigations a sample of 1000 citizens was questionnaired concerning respiratory duct and lung afflictions as well as eye and nose irritations. They were also investigated for past histories of chronic bronchitis. Of the high-pollution area residents 95% showed an affliction of one sort or another. Similar investigations were conducted on daily laborers, and the results were similar. In addition chest X-rays were given to the elderly, and 10% of them from the high-pollution area had an active case of TB which is five time more than in the non-polluted area. Other preliminary tests led to the conclusion that chronic respiratory diseases among the high-pollution area residents are not negligible, and for these patients, pulmonary function test, chest X-ray, EKG, blood test, and British Medical Research Council questionnaire were administered and the results are presently being analyzed.

23102

Nose, Yoshimasa, Kazuko Yoshizaki, Junichi Mise, Yoshimitsu Nose, Takashi Sakurai, Takashi Nakanishi, Shinkichi Nishimura, and Toshiaki Miyoshi

RELATIONSHIPS BETWEEN AIR POLLUTION AND RESPIRATORY DISEASES. PART II. STUDIES ON THE OBSTRUCTIVE PULMONARY DISEASES IN THREE CITIES OF UBE, TOKUYAMA AND ANAYO. (Taiki osen to kodyukikei shikkan. Dainiho. Ube, Tokuyama, Nanyo santoshimin no heisokusei haishikkan). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 4(1):47, 1969. (Proceedings of the Japan Society of Air Pollution 10th, Annual Meeting, 1969.)

A table showing the percentage death rate due to bronchitis/asthma, pneumonia and heart disease for the periods 1960-61 and 1962-63 for three age brackets over 40 indicates that the increase in sulfur dioxide in Ube since 1962 had been accompanied by an increase in death rate due to bronchitis and asthma. A random sampling of 3000 patients of the Internal Medicine Division of the Yamaguchi University Medical School revealed that since 1962 the number of non-tuberculosis type respiratory disease cases has increased rapidly. The percentage increases were 3.0% in 1960 and 4.1% in 1963. The average annual concentrations of settling dust particles and sulfur dioxide in the atmosphere are tabulated over three recen years for Tokuyama, Nanyo and Ube. In Tokuyama and Nanyo, by using the British Medicine Research Council method, questionnaire surveys were conducted, and subsequently more precise physical examinations were performed. Precise data are tabulated, and respiratory disease cases requiring hospitalization are listed by sex, %VC, %MBC and FEV 1.0/EVC.

23103

Oshima, Hidehiko, Masayuki Imai, Katsumi Yoshida, and Masayoshi Kitabatake

AIR POLLUTION EFFECTS ON THE HUMAN BODY IN YOKKAICHI. (Yokkaichi shi ni okeru taiki osen no kenko ni oyobosu eikyo ni tsuite.) Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 4(1):48, 1969. (Proceedings of the Japan Society of Air Pollution Annual Meeting, 10th, 1969.

From 1961 to 1967, affliction and death rates for Yokkaichi were studied in order to investigate pathologically their correlation with air pollution. The annual affliction rate in the area was calculated as the ratio of the number of medical cases obtained from the detailed records of the National Health Insurance Plan (NHIP) billings to the total number of people enrolled in NHIP. At 10% significance level, correlation was observed between cold - bronchitis and sulfur dioxide gas, bronchial asthma and settling dusts as well as sulfur dioxide, and frontal eye disease a settling dusts. Affliction rates were also compared for Yokkaichi and other control areas over the seven year period, and major differences were found for laryngitis, cold-bronchitis, and bronchial asthma as well as frontal eye diseases. In the polluted area, the frequency of bronchial asthma has markedly increased since 1961. Death rates were calculated as three-year averages ove the seven years, and polluted areas in Yokkaichi and control areas in the agricultural regions were compared. In general, death rates were higher in the agricultural areas. Most of the causes were the bloodvessel damage in the central nervous system, total TB and pneumonia. In the polluted area, deaths due to malignant neoplasms were significant. Obstructive repiratory diseases are decreasing in the control area, but are rapidly increasing in the polluted area.

23148

Nose, Yoshikatsu and Nobuko Tokojima

ON THE YEARLY ANALOGY OF AIR POLLUTION BETWEEN UBE-ONODA REGION AND TOKUYAMA-NANYO REGION. (Ube-Onoda chiku to Tokuyama-Nanyo chiku taiki osen no tsuinen no ruijika ni tsuite). Text in Japanese. Yamaguchi Idai Sangyu Igaku Kenkyusho Nenpo (Ann. Report Res. Inst. Ind. Med., Yamaguchi Med. School), no. 16:217-220, 1969. 5 refs.

Mining-industrial cities Ube and Onoda are known as the cites of dust pollution, and Tokuyama and Nanyo of the petrochemical industry are polluted by gaseous pollutants. However, the recent trend in the soluble and non-soluble components of the pollutants, the seasonal wind direction, the decline in the use of coal in Ube and Onoda, and the general tendency in the industry to use more and more petroleum, have all contributed toward the increasing similarity in the nature of pollution in the two groups of cities. In addition, the similarity of the rates of chronic bronchitis affliction in the two general areas indicate that it is related to the similarity of the proportions of soluble components in the settling dusts, especially the pH values, in Ube and Nanyo, and Tokuyama and Onoda. This can be seen in the regression line of the bronchitis affliction rate versus the pH of soluble components, the data points being taken from all four cities and other major bronchitis-prone cities as Yokkaichi and London.

23151

Nose, Yoshikatsu

RELATIONSHIP BETWEEN PROPERTIES OF AIR POLLUTION AND CHRONIC BRONCHITIS AND ASTHMA AS WELL. (Taiki osen no seijo to mansei kikanshien narabini kikanshizensoku to no kanrensei). Text in Japanese. Yamaguchi Idai Sangyo Igaku Kankyusho Nenpo (Ann. Report Res Inst. Ind. Med., Yamaguchi Med. School), no. 16:13-30, 1969. 74 refs.

The relationship between air pollution and respiratory diseases in the industrial cities of Yamaguchi Prefecture was investigated. Th general nature of air pollution has been changing from settling dusts to gases from the combustion of fossil fuels, and correspondingly, the relative predominance of associated diseases have changed from bronchitis to asthma. In three cities, Ube, Onoda, and Mine (settling dusts), the frequency of bronchitis was higher than in Tokuyama and Nanyo (gaseous pollutants). The frequency of asthma was more or less the same for both groups of cities, but in the gaseous pollution cities, in the areas where both dusts and gases are becoming more concentrated, the frequency of asthma is increasing. The higher concentration of sulfur dioxide seems to be associated with the increase in the asthma affliction rate. Also, there was a significant negative correlation between the frequency of bronchitis and the soluble components such as SO3 and Cl in settling dusts as well as their pH. Various data on air pollution such as are caused by settling dusts and gases, and bronchitis and asthma are tabulated and statistical analyses of data are presented.

23582

Bonsignore, D.

THE ERYTHROCYTE ALA-DEHYDRASE ACTIVITY AS A DIAGNOSTIC TEST IN OCCUPATIONAL LEAD POISONING. (L'attivita ala-deidratasica eritrocitaria quale test diagnoltico ned saturnisma professionale). Med. Lavoro (Milan), vol. 57:647-654, 1966. 13 refs. Translated from Italian. Belov and Associates, Denver, Colo., 9p., July 16, 1970.

The effect of lead poisoning on amino-levulinic-dehydrase activity was studied by colorimetrically determining the porphobilinogen, which is formed by ALA-dehydrase activity, present in the erythrocyctes of 50 subjects with chronic or acute lead poisoning. In 19 patients, no enzyme activity could be identified; in the others, it was distinctly lowered. The results demonstrate that diagnosis of ALA-dehydrase acitivity is a valid test of lead poisoning.

23606

Kimura, Kikuzi

ON THE PENETRATION RATE OF GASEOUS MATTER OF INHALED GAS-AEROSOL MIXTURES IN SIMPLE RESPIRATORY MODEL. (Ryujobutsu no kyozonga gasujo osenbutsu no kidonai shinnyu ni oyobosu eikyo ni tsuiteno mokeishiken). Text in Japanese. Rodo Kagaku (J. Sci. Labour, Tokyo), 46(9):544-554, Sept. 10, 1970. 18 refs.

The synergism of gas and aerosol was investigated by means of a simple model of a respiratory tract consisting of a vinyl tube with the inside moistened and a wet tube with the inside moistened under a constant condition. The gases used were sulfur dioxide and nitrogen dioxide. For particulates, dusts in ordinary outdoor air as well as black smoke resulting from the combustion of benzene were used. The penetration rate of SO2 increased with an increase in the flow rate of air through the wet tube or a decrease in concentration. In both cases, the addition of particulates further increased the sulfur dioxide penetration rate. For nitrogen dioxide, the change in the concentration or the flow rate of air did not have any appreciable effect on the penetration rate; the presence of particulate matter also did not have any influence on the penetration rate. The aspiration of air through a glass fiber filter for a dustmeter showed that within an hour after aspiration, the sulfur dioxide in air had the penetration rate of about 100%, but after 20 hours, the rate declined appreciably. Together with the change in value observed due to change in humidity, the observed phenomena indicate that sulfur dioxide gas was absorbed by the sulfuric acid mist to form small particles, which were subsequently trapped by the glass fiber filter.

23876

Blumer, W.

DOES AUTOMOBILE EXHAUST CAUSE HEADACHES? (Kopfschmerzen durch auto-abgase?). Z. Praeventivmed., vol. 14:303-304, Sept.-Oct. 1969. 4 refs. Translated from German. Belov and Associates, Denver, Colo., 4p., Sept. 3, 1970.

Adult inhabitants of a residential area without through traffic were compared with all people living right next to the heavily frequented main street of the same place. The cases concerned include all patients complaining about constant headaches during th past ten years, when no organic cause could be detected by means of general practice. In the houses immediately adjacent to the main street, percentage wise three times as many patients with headaches lived there than in the outside area. Observing these patients for many years, a short change of residence made the headache disappear. One hundred and twelve patients received twice weekly for four to five weeks an intravenous injection of a mixture of calcium-dinitrate-

EDTA (20 mg per kilogram body weight), vitamin C (200 mg), and vitamin B1 (200 mg). This small dosage immediately cured 71% of the patients, distinctly improved 19%, and was unsuccessful with only 10%. In order to prove that this treatment actually causes an increased secretion of lead, a lead analysis of the urine was made for five patients. All cases showed an increase of lead secretion with the exception of one female patient. The people living close to traffic inhale at least four more kinds of exhaust gases (carbon monoxide, hydrocarbon, nitric oxides, tetraethyl lead), which cause headaches as an early symptom themselves and which simultaneously reinforce the toxicity of lead.

24023

Malorny, G.

INFLUENCE OF CARBON MONOXIDE ON EFFICIENCY. Staub, 23(3):156-159, 1963. 3 refs. Translated from German. Belov and Associates, Denver, Colo., 5p., July 7, 1970.

Exhaustibility of the rat during a swimming experiment, fatigue of mice during spontaneous physical labor, and muscular fatigue during electrical irritation of the chewing muscle of the rat were examined during and after exposure to carbon monoxide. Efficiency of the chewing muscles was distinctly decreased by the effects of CO within a concentration region of 0.025 to 0.125% vol. After the introduction of CO was stopped, the decrease in efficiency was reversible for only low concentrations, and then only partially, while permanent damage remained at high concentrations. Higher carbon monoxide concentrations were required to achieve a decrease in efficiency of the motor system in the peripheral area than for deteriorations of the central system. A 1-hr exposure of a mixture of air and of 0.05% vol CO significantly decreased the swimming efficiency of rats. Running distances were decreased by 1/2 with 48 ppm CO and by 1/3 for 55 ppm.

24125

Povoleri, Franco

BRONCHOPNEUMONIA AND THE PRODUCTION OF FERROMANGANESE. (Bronchopolmoniti e produzione di ferromanganese). Med. Lavoro (Milan), vol. 38:30-34, 1947. Translated from Italian. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 9p., Oct. 30, 1969.

Although the cause-effect relationship between ferromanganese production and epidemics of pneumonia in Aosta is not at all clear and convincing, no other cause can tbbbe cited to exp n tttthese events, unless one would ascribe them to a particularly malignant form of epidemic. To some extent, this malignancy could be due to the effect of manganese dioxide fumes and dust inhaled by the population in connection with an increased virulence of the pathogenic germs or, also likely, a chemical form of respiratory tract inflammation and a subsequently increasing development and virulence of the bacteria. Morbidity was similar during this period in the entire population and there was no difference in distribution related to age, sex or profession. It seemed that even the vegetation suffered greatly in the area in which the concentration of smoke was particularly dense. However, ferromanganese production was distinctly most intensive during the summer and autumn months while the highest mortality was always noted during the winter months when there was no production. The gradual disappearance of the epidemic after 1940 may be related either to a spontaneous decline in epidemic characteristics or more likely to the effects of sulfonamide therapy combined with a gradua habituation of the citizens to inhalation of manganese dioxide-lade fumes.

24154

Yamamoto, Kimihiro

HISTOPATHOLOGICAL STUDY OF THE RAT RESPIRATORY ORGAN EXPOSED TO SULPHUR DIOXIDE. (Aryusangasu Kyunyu daikoku nezumi kokyuki no byori soshikigakuteki kenkyu). Text in Japanese. Nara Igaku Zasshi (J. Nara Med. Assoc.), 21(3):267-281, Sept. 14, 1970. 20 refs.

Pathological changes were observed in the respiratory organs of rats exposed to 50-100 ppm or 700-1000 ppm of sulfur dioxide for periods of one day to 25 weeks. Extensive pathological observation were made in airways and alveoli by horizontal longitudinal section of the total lungs with the trachae. In addition, histological typ of airway epithelium were classified. Airway epithelim of exposed rats exhibited disappearance of cilia, erosion, increase of mucous cells, squamous cell metaplasia, and hyperplasia. Also observed was elongation of epithelial cells from terminal bronchiole to alveolar walls. Infiltration of small round cells and proliferatio of collagen fiber were found in peritracheae, peribronchi, and peribronchioles. There was also perivascular infiltration and congestion in alveoli capillaries, and infiltration of small round cells in alveolar walls and alveoli. Abscesses progressed from bronchus were noted in the lungs of rats exposed to 700-1000 ppm SO2. In general, there were no marked differences between pathological changes following exposure to 50-100 ppm SO2 and those following exposure to 700-1000 ppm.

24230

Nada-Ku Medical Assoc., Kobe (Japan), Higashinada-Ku Medical Assoc., Kobe (Japan), and Kobe Municipal Office (Japan), Bureau of Public Health

EPIDEMIOLOGICAL SURVEY OF EFFECTS OF AIR POLLUTION IN THE EAST AREA OF KOBE CITY. (Kobe-shi tobu ni okeru taiki osen ekigake chosa ni tsuite). Text in Japanese. Nippon Ishikai Zasshi (J. Japan Med. Assoc.), 63(10):1339-1346, May 1970. 9 refs.

The difference in incidences of common cold, bronchitis, bronchial asthma, pulmonary emphysema, lung cancer, and pneumonia between polluted and nonpolluted areas in Higashinada and Nada wards of Kobe were studied. Medical practitioners in the district selected the patients to be studied from their medical charts, and completed the questionnaires on the epidemiological survey of air pollution in Higashinada and Nada Wards. These two districts were divided into three areas according to the degree of air pollution. Area-AI had a sulfur dioxide concentration of more than 1.0 mg and an average amount of settling dusts of more than 20 t/month. In Area-AII, the SO2 concentration was the same as in Area-AI; the amount of settling dusts was 10-20 t. In area -B, SO2 was less than 1.0 mg and the amount of sedimented dusts was under 10 t/month. This district was assumed to be nonpolluted. The returned questionnaires were 67,483 for the first survey and 18,274 for the second survey. The sulfur dioxide concentration of less than 1.0 mg is not likely to influence the morbidity of respiratory diseases, but for women over 40 who live in the same area for a long time, there might have a slight effect. The data show that even at this low level of sulfur dioxide gas, the combination with dusts does have an effect on human health. Comparing the polluted and non-polluted areas, the only symptoms that manifest any significant difference were cold-related, and there was no significant difference in the frequency of asthma in the two areas.

24392

Novakova, Eliska

THE INFLUENCE OF INDUSTRIAL POLLUTION ON ANIMAL COMMUNITIES AND THE USE OF ANIMALS AS BIO-INDICATORS. (Influence des pollutions industrielles sur les communautes animales et utilization des animaux comme bioindicateurs). Air Pollution. Proc. First European Congr. Influence Air Pollution Plants Animals, Wageningen, Netherlands, 1968, p. 41-48. 9 refs. Translated from French. Belov and Associates, Denver, Colo., 11p., Sept. 15, 1970.

Analyses made on blood samples from hares shot during the fall hunting season confirmed the possibility of using hares as indicators of industrial air pollution and of the presence of certain pesticides. The distribution of harmful emissions can be estimated by analyzing some elements of the erythrocytes (hemoglobin, hematocrit, and eventually globular saturation). In general, the blood values decrease with increased pollution, except in a few cases of very high SO2 emissions. The pH of the urine varies: in cement-producing areas, it is over 7.0; in SO2 areas, it is below 7.0. A good practical criterion is the multiplication coefficient calculated from the number of young and full-grown hares killed. For hares in an area of mixed ash and sulfur dioxide pollution, the multiplication coefficient was 30% lower than for controls. In contrast, the coefficient was higher by 35% in an area rich in cement dust. The present investigations, which covered mainly the influence of gaseous SO2 and hydrogen fluoride, point to a decrease in the number of insects (without an actual decrease in the number of species) with increasing pollution. The differences in the taxonomic groups are not pronounced: the decrease in number is almost uniform in all categories. However, a slight increase was noted in the Phytophaga in the most polluted zone and in the Zoophaga in a less polluted zone.

24573

Ohm, H. J.

THE LOCALIZATION OF LEAD DEPOSITED IN HUMAN TEETH. (Die Lokalisation des in meschliehen Zaehen abgelagerten Belis). Deut. Zahnaerzrtl., 24(3):202-209, March 1969. 42 refs. Translated from German. Belov and Associates, Denver, Colo. 16p., Sept. 8, 1970.

Healthy and decayed human teeth were fixed immediately after extraction in alcohol containing hydrogen sulfide and were then decalcified with hydrogen sulfide saturated with formic acid. After subsequent deacidification and desalination, the teeth were frozen in crystals and mounted on glass covers. Physical development was carried out with a mixture of gum arabic solution and silver nitrate. With this method deposits of lead were demonstrated and their location determined. In tissue sections, deposited lead sulfides appear as find brown to black granules afte physical development. Lead appears to have a preference for the small canals in the dentine, layers of secondary dentine, and interglobular spaces as well as for cement. The distribution of th lead sulfide particles in the individual dentine regions also shows a direct dependence on metabolism. Similarly, it is possible to recognize a change in the distribution of lead sulfide granules in the region of decalcification due to caries.

24586

Wefring, K.

PNEUMONIA IN THE AREA OF THE SAUDA FACTORIES OF RYFLYKE. Tidsskr. Norske Laegeforen., vol. 49:553-568, 602-612, 1929. Translated from Norwegian. 25p.

A description is provided of an investigation in a Norwegian town wherein the residents were blaming a high incidence of pneumonia accompanied by an abnormally high mortality rate on the smoke from a local ferromanganese plant. It is concluded that the function of the plant in the spread of the disease is to provide the point of contact for the contageous transfer of a highly virulent strain of pneumococcus; no case could be presented for causation by the smoke or any of its constituents. The remedy suggested is innoculation of the inhabitants and isolation of pneumonia patients.

24731

Nolte, D.

BODYPLETHYSMOGRAPHY. (Ganzkorperplithysmographie). Beitr. Klin. Erforsch. Tuberk. Lungenkr., vol. 140:265-272, 1969. 16 refs. (Presented at the German Association for Tuberculosis and Pulmonary Diseases, 23rd Scholarly Convention, Baden-Baden, Germany Oct. 16-19, 1968.) Translated from German. Belov and Associates, Denver, Colo., 10p., July 27, 1970.

In the past, quantitative evaluation of an obstruction in the respiratory passages depended on measuring parameters of pulmonary function, the values of which reflect flow during forced ventilation and are contingent to a great extent on the assistance of the subject. Direct analysis of bronchial flow resistance is no possible by means of a procedure, body plethysmography, which measures synchronous respiratory changes in volume of the lungs as a change in volume of the whole body. Simultaneously, the process measures intrathoracic gas volume (IGV), which is significant in the diagnosis of emphysema. Measurements are made while the patient sits in a narrow, sealed chamber into which warm, moist air is directed. Chamber pressure and intensity of respiratory flow are recorded during a complete respiratory cycle, the measurements yielding a closed pressure or 'hackle' curve that describes the relationship between alveolar pressure and chamber pressure. Resistance and IGV are read on a nomogram. The method makes it possible to determine whether an obstruction in respiratory passages is functional (and thereby reversible) or morphologically fixed.

24935

Just, Jan, Stefan Maziarka, and Maria Deugasiewicz

THE DEATH RATE DUE TO LUNG CANCER IN PEOPLE LIVING IN SELECTED TOWNS IN POLAND IN THE POLLUTION OF THE ATMOSPHERE. (Umieralnosc na raka puc mieszkancow wybranych miast polskich a zanieczyszczenia powietrza atmosferycznego). Roczniki Panstwowego Zakladu Higi., 20(5):515-526, 1969. 25 refs. Translated from Polish. Belov and Associates, Denver, Colo., 16p., July 29, 1970.

A correlation between atmospheric pollution and the morbidity and mortality from respiratory tract cancer in ten Polish towns was investigated. The statistical analysis did not reveal any correlation between the total amount of atmospheric dust and the death rate from cancer of the lungs and the bronchi. Some correlation existed between the degree of pollution of the air in the investigated cities by aromatic polycyclic hydrocarbons and the death rate from cancer of the lungs and the bronchi. Among the tested towns, the highest level of these hydrocarbons was in the atmosphere in Zabrze, Katowice, and Gdansk; in all these cities, the death rate from cancer of the lungs and the bronchi was the highest. Warsaw had the lowest level of aromatic polycyclic hydrocarbons in the atmosphere among all investigated towns. Simultaneously, Warsaw had also one of the lowest death rates from cancer of the lungs and the bronchi.

25341

Dogan, S. and T. Beritic

INDUSTRIAL AND CLINICAL ASPECTS OF OCCUPATIONAL POISONING WITH MANGANESE. (Industrijsko-higihenski i klinichi aspekti profesionalnog otrovanja manganom). Arhiv Hig. Rada, vol. 4:139-212, 1953. 179 refs. Translated from Serbo-Croatian. Data Methods Corp., Denver, Colo., 95p., Oct. 20, 1970.

Ten cases of manganese poisoning were observed from 1949 to 1953 among workers exposed to dust and smoke at a manganese alloy plant. The length of exposure ranged from 18 months to 12 years. Clinical findings corresponded to symptoms of light parkinsonism. In the case of two workers, the intoxication was manifested by hemoparkinsonism. All victims were subject to muscular cramps and uncontrollable laughter. Blood analyses showed slight leukopenia in five patients. Treatment with 2,3-dimercaptopenol ('BAL') or pyrodoxine was ineffective. The difficulties of diagnosing manganese poisoning are stressed, the distribution of manganese ores noted, and studies of the toxicology and pharmacology of manganese reviewed. In addition, symptoms of manganese poisoning are detailed and the effects of manganese on liver, blood, and lungs reviewed. To prevent manganese poisoning, attention should be given to characteristics of manganese ores, i.e., the percentage of various manganese oxides, the extent to which the ores disintegrate, and their content of hepatotoxic materials. Good ventilation is essential, as are periodic examinations of workers.

26024

Yamaguchi, Seiya, Yo Ono, and Hisao Matsumoto

EFFECT OF AIR POLLUTION ON THE INHABITANTS IN OMUTA WITH SPECIAL REFERENCE TO THE FINDINGS OF LUNG FUNCTION AND CHEST X-RAY FILM. (Omuta Shimin ni oyobosu taikiosen no eikyo. Toku ni hai kino, kyobu ekkususen shoken ni tsuite). Text in Japanese. Saigai Igaku (J. Accidental Med.), 11(9):917-932, Aug. 1970. 16 refs.

As a part of the second Omuta City epidemiological investigation of the influence of air pollution in August 1966, thoracic x-ray examination was done on the 2626 residents who live in the contaminated area and in the control non-contaminated area. Examination of pulmonary function was done by Peak-Flow-Meter and Vitalor on the 520 school boys and 527 school girls (aged 8-12), and the 1104 mothers (aged 24-55) of the school children, who lived in the present addresses for more than five years. The monthly average of falling soot and dust and sulfur trioxide concentration in all of the area were 26.5 t/sq km/month, and 0.76 mg/D/100 cu cm PbO2. Thoracic x-ray examination revealed tuberculous changes at a higher rate of 7.5% in the contaminated area and 4.2% in the non-contaminated area. The average of the mothers' vital capacity was higher in the control area; the ratio which did not reach 80% in the percentage of the estimation was more or less higher in a part of contaminated area. The average of PFR showed obviously a low figure in a part of the contaminated area. In the comparison of PFR by height, it was at the lowest in a part of the contaminated area and higher in the non-contaminated area. The average figure of vital capcity in school children, both of boys and girls, showed a tendency to be smaller in the contaminated area. It did not always show the parallel relation with air pollution. PFR in boys showed a higher figure in the contaminated area, and the regression line of PFR against the vital capcity showed a slight difference in the low vital capacity group; the higher the vital capacity, the lower was the PFR in the contaminated area. The average of 0.5 second amount figures by height and figures by height with MEFR in boys were higher in the non-contaminated area. From the result of this investigation, the mothers' PFR, school children's PFR, 0.5 second amount, and the expired air flow shown in MERF were reduced in the contaminated area.

26025

Hiroshima Prefecture Health Measure Council (Japan), Expert Committee No. 4

THE INFLUENCE OF AIR POLLUTION ON RESPIRATORY APPARATUS OF THE INHABITANTS OF BOTH OTAKE AND KURE CITIES. **(Otake, Kure ryoshi ni okeru taikiosen no kokyuki ni oyobosu eikyo). Text in Japanese. Hiroshima Igaku (J. Hiroshima Med. Assoc.), 23(10): 833-842, Oct. 1970. 9 refs.**

An investigation area of (1) heavy pollution with an average sulfur trioxide concentration of 0.60 - 0.9 mg/day/100 sq cm PbO2, and an average falling soot and dust concentration of 5.81-39.48 t/sq/ km/month and a (2) control area of mild pollution with an average SO3 concentration of 0.38 - 0.59 mg/day/100 sq cm PbO2 and average falling soot and dust concentration of 7.79 t/sq km/month were selected for study in November 1969. Interviews and questions using a BMRC questionnaire and simple pulmonary function tests using vitalor were made for the 290 inhabitants who were chosen at random from the men or women more than forty years of age and lived in the areas. There were 93.3% inhabitants who lived at the present address for more than five years; 98.6% of them answered the questionnaire. Cough, sputum, short breath, rest because of respiratory disease, and bronchitis showed generally a high rate; compound symptoms showed a low rate. Men showed a higher rate in almost all items except short breath than women, but no significant difference was found. Although there was no significant difference between the areas, both men and women in the investigation area showed a higher rate than the control area in cough at day or night, acute increase of cough and sputum, rest because of respiratory disease, bronchitis, and respiratory asthma. The relation between respiratory symptoms and smoking was studied only in men. The smokers showed a higher rate than non-smokers or former smokers in continued sputum and short breath of more than grade three, and in compound symptoms except cough; but there was no significant statistical difference and no obvious difference between areas. In the simple pulmonary function test, only 2.2% of subjects showed an abnormal figure where less than 60% of the rate for one second was abnormal; no significant difference could be found between areas. Although the influence of air pollution is obscure at present, the result suggest that a slight influence begins to appear.

26051

Yoshida, Zengi, Yuichiro Yamashiro, Yoshinobu Maejima, and Tetsuo Kubakawa

STUDIES ON THE RELATIONSHIP BETWEEN AIR POLLUTION AND INFANTILE ASTHMA ATTACKS. USING THE SO2 CONCENTRATION IN THE AIR AS AN INDICATOR. **(Taikiosen to shonikikanshi zensoku hosse no kanren-- taikichu SO2 nodo o shihyo to shite). Text in Japanese. Shounika Rinsh (Japan J. Pediat.), 23(8):983-990, Aug. 1970. 18 refs.**

In order to study the relationship between sulfur dioxide concentrations in the air and attacks of asthma, 107 cases of the out-patients with asthma at the clinic of allergy in the department of pediatrics of Juntendo Hospital were studied throughout 1968. Sulfur dioxide concentrations were investigated according to the results of the measurements of air pollution made by an auto recorder reported by the Bureau of Capital City Development (published in March 1969). The frequency of the attacks of asthma was studied on the basis of hospital cards and diaries recorded by the patient's family. The relationship of SO2 concentrations and attacks of asthma in the following four divided areas was summarized on a monthly basis: (1) Koto-ward, (2) Edogawa-ward, (3) Chiyoda, Chuo, Bunkyo, Daito, Shinjuku, Koto, Minato and Shinagawa wards, and (4) Setagaya, Itabashi, and Edogawa wards. No correlation was found. The results did not indicate that SO2 concentrations in the air were high when attacks were frequent or that more attacks occurred on the days when SO2 concentrations were high. Thirty three cases of infants living in Chiyoda, Chuo, Bunkyo, Daito, Shinjuku, Koto, Shinagawa, and Minato wards where SO2 concentrations were thought to be comparatively high were investigated on a day when a warning against smog was announced or on the following day. No tendency for attacks of asthma to occur more frequently on those days were noticed.

26305

Imai, Masayuki, Hidehiko Oshima, Yoshikazu Takatsuka, Masayoshi Kitabatake, and Katsumi Yoshida

PRESENT STATE OF AIR POLLUTION IN YOKKAICHI AND VARIOUS MEDICAL PROBLEMS ABOUT IT. (Yokkaichi-shi ni okeru taiki osen no genkyo to igakuteki shomondai). Text in Japanese. Sangyo Igaku Kenkyusho Gyosekishu (Report Inst. Ind. Med.), no. 3:48-55, June 1969. 16 refs.

Conditions of air pollution, epidemiological investigations, the findings of medical examinations of the inhabitants and school children and the state of the patients connected with air pollution in Yokkaichi city were reported. Falling dust has decreased with every year or remains on the same level; however, a proportion of soluble components is much more than that of other cities, and soluble components have been acidified constantly with every year since 1961. Sulfur dioxide increased rapidly from the end of 1961 to early 1962, and remained on the same level afterwards; however, the trend of increase has been observed since 1965. Nitrogen dioxide is below about one tenth compared with SO2. Sulfuric acid is detected from the air almost constantly. The incidence rates of various diseases were observed by means of receipts of the National Health Insurance for 4 years from 1961. The diseases which were recognized to be very related to air pollution were common cold, bronchitis, front ophthalmopathy, bronchial asthma, and pharyngitis There was high correlation between the diseases and SO2 rather than falling dust. Furthermore, a high correlation was observed among infants and children in pharyngitis, and among aged people in bronchial asthma. The investigation by means of questionnaires was carried out on the inhabitants of over 40 years of age in contaminated areas chosen with different pollution levels. The number of people suffering from chronic bronchitis and asthma-like attacks increased with the height of the degree of pollution with SO2 in the area. Medical examinations in junior high schools in contaminated areas also showed the tendency to obstructive disturbances. Half of the recognized patients by the Environmental Pollution Relief Law were seen in Shiohama district, a high contaminated area. The people who had moved to outside the city or non-contaminated area showed clinical improvement or healing at a high rate after moving out.

26306

Kanagawa Prefecture Board of Education (Japan)

ACTUAL REPORT OF INFLUENCE OF AIR POLLUTION ON THE BODIES. (Kogai (taiki osen) ga shintai ni oyobosu eikyo no jittai chosa hokokusho) Text in Japanese. 40p., March 1969.

For investigating the influence of air pollution on the bodily functions of elementary and middle school boys and girls in Kauagaw Prefecture, medical examinations of oto-rhino-laryngology and ophthalmology were made by specialists during May and July, 1968. Selection criteria of contaminated degrees were as follows: contaminated area (area I) was where the yearly average of sulfur dioxide concentration was more than 2.0 mg SO2/day/100 sq cm PbO2 and falling soot and dust amounts were more than 100t/sq km/month; and non-contaminated area (area II) was where SO2 concentration was less than 1.0 mg SO2/day/100 sq cm PbO2 and falling soot and dust amounts were less than 6.0 t/sq km/month. Subjects were 3225 boys and girls in area I and 3102 in area II. Examinations of oto- rhino-laryngology were made concerning earwax, otitis media, auris externa, deafness, hypertrophic rhinitis, atrophic rhinitis, other kinds of rhinitis, sinusitis, nasal polyp, deformity of the septum, nasal vestibule disease, nasal vestibule pollution, tonsillar hypertrophy, tonsillitis, adenoids, pharyngitis, and tracheophony. The items which showed a higher rate in area I and which were significantly different from area II were earwax, sinusitis, nasal vestibule diseases, and nasal vestibule pollution; each prevalence rate was 13.8%, 8.2%, 3.7% and 1.8% in area I, and 4.9%, 1.1% and 0..% in area II. There was a significant difference between area I and area II in the prevalence rate of 4 items of oto-rhino- laryngology. From previous reports or conditions of air pollution, it seemed that school boys and girls in area I had a larger intake of contaminant in the upper respiratory tract compared with those of area II; upper respiratory tract or whole respiratory apparatus seemed to be affected in some degree by the air pollution. Examinations of ophthalmology were made concerning follicular conjunctivitis, chronic conjunctivitis, eczematous blepharitis, pseudotrachoma, tarsal cyst, acute conjunctivitis, hordeolum and trachoma. Follicular conjunctivitis, eczomatous blepharitis, and acute disease were more in area I; chronic conjunctivitis, pseudotrachoma, and tarsal cyst were more in area II, but there was no significant difference between area I and II. The prevalence of diseases was the most in Kawasaki area which belonged to area I, bu it seemed that the difference of home environment generally caused ophthalmological diseases.

26324

Garbe, E. and M. Brunet

CANCER AND AIR POLLUTION. SOME OBSERVATIONS FROM THE STANDPOINT OF GEOGRAPHICAL PATHOLOGY. (Cancer et pollution atmospherique. Quelques aspects de pathologie geographique). Text in French. Bull. Inserm, 25(2):201-212, 1970. 10 refs.

By means of a correlation coefficient, a study was made of the relationship between cancer mortality and what are regarded as pollution indicators: the consumption of solid and liquid fuels. It was concluded that, generally speaking, one must consider 'urbanism' in its collective entirety, rather than singling out the consumption of fuels as a factor representing air pollution. The localization problem for cancer seems to correlate better with an 'industrial and technological factor' represented by the consumption of petroleum products. The localizations involved are the lungs in men, leukemia in men and women, the upper respiratory and digestive tracts in men, and the uterus and uteral cervix in women. Attempts to separate the 'pollution' factor from the industrial-technological factor were unsuccessful. Results indicated that the starting point in further study would be the distinction between urban and rural environments and the exogenous factors that influence these.

26516

Nose, Yoshikatsu

AIR POLLUTION AND INFANTILE RESPIRATORY DISEASES. (Taiki osen to shoni kokyuki shikkan). Text in Japanese. Shonika Rinsho (Japan J. Pediat.), 23(4):471-482, April 1970. 32 refs.

In 1969, 30,000 school-children in five cities in Yamaguchi Prefecture were given questionnaires in order to clarify epidemiologically the relationship between air pollution and infantile respiratory disease. Common epidemiological phenomena were observed between asthma, asthmatic bronchitis, and bronchitis; it was not clear from the questionnaires alone whether the similarities were due to the definition, diagnosis, or classification of illnesses, or because the three diseases are actually related. Various statistical analyses are presented for such items as the correlation between sulfur dioxide concentration and asthma, bronchitis, and asthmatic bronchitis, past history of school children regarding the three types of ailments, and the frequency distribution of past history of the illnesses with age. In order to clarify the relationship between the diseases and air pollution, more multi-factorial studies have to be made with the emphasis on the environment, cause of illness, and the carrier, based on the correct understanding and diagnosis of the respiratory symptoms.

26523

Ishizaki, T., Akimasa Miyamoto, Junzaburo Kabe, Shohei Makino, Taro Kodama, Hirosuke Nakazawa, and Yukio Matsumura

AIR POLLUTION AND ASTHMA. (Taiki osen to zensoku). Text in Japanese. Nihon Kyobu Rinsho (Japan J. Chest Diseases), 28(10): 703-709, Oct. 1969. 25 refs.

Asthma is an illness very hereditary in nature, and there are many inducements to asthma. In the case of air pollution, many studies have shown that it can be an inducement for asthma, but the question of whether air pollution can be an actual cause is yet to be answered. Various characteristics of bronchial asthma symptoms are described and past statistical studies on the group examination of factory workers in Kawasaki, for example, are explained. The study of medical records over a period of three years shows that asthma tends to be related to weather. For example, on days when the temperature is lowered by more than 3 degrees, especially on rainy days, asthma tends to occur more frequently. Also when there are many suspended particles in the atmosphere, asthma attacks are frequent. This is probably because sulfur dioxide is easily absorbed by suspended particulates. Other items described are the effects of SO2 gas on respiratory function, the susceptibility of the respiratory tract, and the relationship between asthma and chronic bronchitis.

26530

Joint Group for Air Pollution Research (Japan)

EXPERIMENTAL AND CLINICAL STUDY OF THE EFFECTS OF AIR POLLUTION ON THE RESPIRATORY SYSTEM. (Taiki osen no kokyuki ni oyobosu jikken narabi ni rinshoteki kenkyu). Text in Japanese. Kokuritsu Kekkaku Ryoyojo Kyodo Kenkyu Nenpo (Ann. Rept. Joint Studies Natl. Tuber. Sanatoria), vol. 5:97-104, 1968.

In order to study pathologically the effect of sulfur dioxide gas o the human respiratory system and to shed some light on the development mechanism of respiratory disorders, dogs were studied and clinical experiments were conducted. At high concentrations (30-300 ppm) of SO2, the dogs all died within 3-30 days and bronchitis, blood congestion in the lungs, and lung edema were observed. At low concentration (2 - 3 ppm), thickening of alveoli walls with pneumatosis and interstitial pneumonia were diagnosed, and there was no bronchitis. With respect to smoke concentration at a Ringelmann chart level of 2 - 3, the dogs had a high degree of blood congestion of the lungs and died within 2 - 5 days. Sulfur dioxide gas increased the resistance of the human respiratory tract over time, but the phenomenon was reversible. The degree of resistance increase was larger for non-smokers. There was no definite correlation between the infant bronchial asthma and infant tuberculosis and suspended particulates. The examination of the Yokkaichi asthma patients showed that there was a marked decrease in one-second rates and the appearance of pulmonary P.

26558

Amagasaki Medical Assoc. (Japan)

PRESENT RATES OF AIR POLLUTION AND RESPIRATORY DISEASES IN AMAGASAKI. THE 1ST REPORT. (INVESTIGATION IN 1969). (Amagasaki-shi ni okeru taikiosen to kokyuki shikkan no genkyo. Dai 1 po. (Showa 44 nendo chosa)). Text in Japanese. 64p, 1970. 7 refs.

Investigations of the living environment and respiratory disease were carried out on 5284 patients who visited medical organizations in Amagasaki for a main complaint with respiratory symptoms on August 27, 1969. Results showed an affirmative opinion to the present states as 57.6% and a negative opinion as 41.7%. According to a residential analysis between highly polluted and lowly pollute districts, the negative opinion was 73.0% in a highly polluted district and 19.2% in a lowly polluted district among the over 40 age group. The rate of the patients per 100,000 inhabitants over 40 years old was 1442.7 in a highly polluted district and 693.1 in a lowly polluted district, and there was a marked difference betwee the two districts. The inquiry by a round-postcard with questionnaires was performed with respect to 1285 persons over 40 years old who were the inhabitants of Kuise-Kajigashima and Tsukiji districts where the concentrations of sulfur dioxide were high (the former was 3.89 mg/day/100 sq cm; the latter, 4.80 mg/day/sq cm), in order to find a crude prevalence rate of chronic bronchitis. The return rate of the questionnaire postcards was almost 100%, an the crude prevalence rate of symptoms was 9.0% at Kuise-Kajigashima district and 11.1% at Tsukiji district. The prevalence of symptoms in males was considerably higher than in female. However, no clear causal relation could be found as to the frequencies by age and the smoking habit. Oral test based on the BMRC standard questionnaire was carried out on the patients who complained of coughing and sputum in the questionnaires; the rate of agreement between the results of the oral test and questionnaire was 95%. The corrected prevalence rates of symptoms were obtained from crude prevalence by correcting the gap between distributions of the patients by sex, age, and smoking habit. These corrected prevalence rates were 9.1% at Kuise-Kajigashima district and 11.0% at Tsukiji district. Physical examination, respiratory function test, roentgenographic examination, examination of sputum, and electrocardiography were carried out in order to justify the above investigations.

26764

Shirai, Junzo

A CLINICAL STUDY ON CHRONIC NON-SPECIFIC LUNG DISEASE IN YOKKAICHI AIR-POLLUTED AREA. CLINICAL CHARACTERISTICS OF YOKKAICHI ASTHMA. (Yokkaichi-shi ni okeru mansei hitokuisei kokyuki shikkan no rinshoteki kenkyu. Iwayuru Yokkaichi Zensoku no rinshozo ni tsuite). Text in Japanese. Nippon Kyobu Geka Gakkai Zasshi (J. Japan Assoc. Thoracic Surg.), 8(1):1-16, May 1970. 41 refs.

A study was undertaken to analyze clinical characteristics of so- called 'Yokkaichi asthma' and clarify the disease state of chronic non-specific lung disease frequently observed in the Yokkaichi area This area is a center of petroleum industry and known to be highly air-polluted with sulfur dioxide and other unknown irritating gases The study was based on 120 patients who were referred for respiratory symptoms during the period June 1967 to December 1968. These patients had been residents at the highly air-polluted area for more than 3 years and had symptoms of chronic obstructive lung disease. One hundred twenty patients consisted of 59 males and 61 females. The age ranged from 16 to 83 years, but the majority of the patients (95 out of 120) were older than 40 years old. Symptoms of chronic bronchitis were noted in 55.8% of the cases, these of asthma attack in 70.8%. And symptoms of these two disorders coexisted in 35.0% of the cases. The increased incidence of these patients seemed to be closely related to the elevation of air pollutants at the area. Seasonal exacerbations of symptoms are also noted when the area is more air-polluted. Thirty nine out of 120 patients had a previous history of allergic disorders and 26 had allergic family history. Allergic skin reaction (using house dust) were positive in 18 among 119 cases tested. These figures are lower than seen in patients with bronchial asthma in other areas. Increased eosinophils in blood and sputum were noted in 33 out of 104 and 25 out of 87, respectively. Fifty eight out of 107 patients had sputum expectoration of more than 10 ml for 24 hours. Acetylcholine inhalation test (using 1000 micrograms or less) was positive in 10 out of 51 patients when judged by EFV1 only and in 31 out of 55 patients when judged by EFV1 and/or respiratory resistance. In chest roentgenogram, inflammatory and emphysematous changes were frequently noted. In pulmonary function tests, many cases showed an obstructive pattern, an elevated respiratory resistance and a poor response to bronchodilator. Based on the above clinical observations and diagnostic standards of chronic nonspecific lung disease stated by the American Thoracic Society of 1962, 'Yokkaichi asthma' can be classified into 4 groups of known disease categories 1) 55 cases of bronchial asthma; 2) 36 cases of chronic bronchitis, 3) 21 cases of bronchial asthma with chronic bronchitis; 4) 8 other cases. In younger age groups, bronchial asthma (group 1) was predominant. In groups older than 40 years of age, bronchial asthma (group 1), chronic bronchitis (group 2) and coexistence of these (group 3) were observed in 38, 31 and 20 cases, respectively.

26987

Yamanaka, Akira, Shigeki Saiki, Toyohiko Morita, and Hisao Itaya

PATHOLOGICAL MORPHOLOGY OF CONTAMINATED LUNGS - - FUNDAMENTAL CONSIDERATION. In: Histopathological Study on Contamination of Human Lungs Caused by Air Pollution. 1967. 25 refs. Translated from Japanese. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, p. 62-85.

The defensive structures of the lungs, including the airway mucosa (ciliated epithelia and germinal cells), the tracheal and bronchial lymphogonia, non-striated muscles and elastic fibers, and lymph follicles, are reviewed in relation to the morphology of various chronic lung diseases and possible associated effects with air pollution. The occurrence of dust inhalation diseases depends on the composition, size, concentration, and properties of the particles; the victim is affected according to his sensitivity, the intensity and duration of inhalation, and existence of other respiratory problems. Particle size is an important factor; large particles are likely to be held in the nasal cavity and larynx, but smaller ones of up to 100 micron can pass through the respiratory tract to the air vesicles. Particles accompanied by sulfur dioxide or other toxic gases tend to settle far more than when inhaled alone. Aspects of anthracosis, or pulmonary deposition of carbon dust, as a morphological disease caused by air pollution, are discussed, including fibrotic changes, age factors, emphysematous changes, characteristic distribution of deposits in the lung, and the course of carbon dust through the air vesicles into tissue.

27653

Watanabe, Hiroshi and Fusa Kaneko

EXCESS DEATH THROUGH THE AIR POLLUTION IN OSAKA CITY. PART II. (Taiki osen ni yoru shiboshasu zodai ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 4(1):59, 1969. (Proceedings of the Japan Society of Air Pollution, Annual Meeting, 10th, 1969.)

In the period 1962-1967, the daily variation of death rate in Osaka Prefecture was investigated. 'Excess deaths' was defined as the number of deaths when the three-day average death rate was higher than the 15-day average plus one standard deviation. Data were studied to see if there were any excess deaths in the outlying agricultural area within the three-day period in which there were excess deaths in Osaka (city). When there were no such excess deaths, then the deaths in the city were termed the metropolitan type. Other terminologies were similarly developed for different types of deaths, in all cases comparing the agricultural and metropolitan sectors. Statistical analyses were performed to find the various correlations between continuous three-day long pollutio due to sulfur dioxide over 0.15 ppm or suspended dusts over 0.75 mg/cu m and excess deaths in that period. Looking at the deaths by various types of illnesses, deaths due to circulatory ailments fluctuate similarly to the deaths due to illness in general. But deaths due to respiratory diseases do not always follow the pattern. Respiratory illness deaths other than TB and neoplasms are not always covariant with total deaths, but they frequently increase in periods when excess deaths are observed in one or more of the three sectors of the Osaka metropolitan area.

28164

Mizuno, Hiroshi

REPORT OF RESEARCH ON EFFECTS OF AIR POLLUTION ON THE HEALTH OF CITIZENS OF NAGOYA. (Taiki osen ga Nagoya shimin no kenko ni oyobosu eikyo ni kansuru chosa hokoku). Text in Japanese. Nagoya Univ. (Japan), Dept. of Public Hygiene, 88p., 1969.

Although the degree of air pollution in Nagoya as a whole is still low, the situation in the industrial area of the city is deteriorating. This was demonstrated by the results of a survey of the health effects of waste gases from petroleum combines and other sources. In the polluted area, there were increased deaths due to respiratory diseases among men and women over 70. The correlation between the male death rate and sulfur dioxide concentrations was 0.60--0.70 for men over 50. Symptoms of respiratory infections were one and one-half to two times more frequent than in nonpolluted areas, and there were more individuals who caught five or more colds a year. Women 40-60 years old who had lived in the area for more than five years showed reduced lung function. In addition, the polluted area had increasing infant mortality rates in contrast to the reduction noted for other areas. Residents of the industrial area complained mainly of odors and were able to identify their exact sources. The residents appeared to rely on the national and local governments for a solution, not realizing that they themselves could initiate action.

28205

Gaultier, M., P. Gervais, P.-M. de Traverse, P.-E. Fournier, N.-L. Coquelet, A.-M. Loygue, and H. Housset

GENETIC VARIATIONS IN THE HEMOBLOGIN CAUSED BY THE PROFESSIONAL ENVIRONMENT. Arch. Maladies, Profess. Med. Trav., Security Sociale, 29(4-5):197-203, April-May 1968. 19 refs. Translated from French. Belov and Associates, Denver, Colo., 14p., Nov. 13, 1970.

Qualitative hemoglobinopathia and thalassemic syndromes have become very frequent in the Paris region due to immigration of workers of Mediterranean or African origin, working under conditions such as exposure to benzene, lead, or ionizing radiation The irregularities most frequently discovered are hemoglobins S and C on the one hand, thalassemia on the other hand. These red blood corpuscle irregularities sometimes pose diagnostic problems because of the presence of red blood corpuscles of basophilous granulations in lead poisoning and in thalassemic syndromes. The existence of a hemolytic process and aplasic attacks, in the course of different toxic hemopathia and in hemoglobinopathia, has lead numerous authors to eliminate the subjects carrying hemoglobin irregularities from any work which could possibly involve the danger of exposure to a hemotoxic substance. Comparative studies of toxic environment and hemotological functions of subjects carrying red blood corpuscle irregularities would be desirable in order to justify the professional classification of populations where red blood corpuscles variations are numerous. (Author summary modified)

28351

Shimizu, Tadahiko and Yoshizo Tsunetoshi

EQUATION OF THE PREVALENCE OF CHRONIC BRONCHITIS---EFFECTS OF AIR POLLUTION. (Man-seikikanshien yushosharitsu no hoteishiki---taikiosen no eikyo no okisa). Text in Japanese. Seijinbyo (Adult Dis.), 10(1):61-70, Sept. 1969.

The prevalence of chronic bronchitis 13,100 persons 40 years of age or more who lived in six districts in Osaka was theoretically examined. The equation of the prevalence was derived from age, amount of cigarettes smoking, and degree of air pollution. Values calculated from the equation were compared with actual ones. The diagnosis of chronic bronchitis was based on Fletcher's definition. The equation derived from amount of smoking and age was y equals 0.0001 .3N(x minus 20) squared (I) where N is the amount of smoking per day; x, the age; and y, the prevalence of chronic bronchitis(%). The equation derived from sulfur trioxide content, as measured by the PbO2 method, was y, equals 1.94 alpha plus 0.71 (II) where alpha is SO3 content; y the corrected prevalence. To exclude the influence of smoking and age on the prevalence of chronic bronchitis, these values were corrected to standard values, and the prevalence calculated from them was designated corrected prevalence. The equation of the prevalence of chronic bronchitis, y equals 0.0001 .3.N(X-20) squared plus 1.94 alpha minus 3.18, was calculated from equations I and II where for female nonsmokers N equals 4; for male nonsmokers equals N equals 8; for 1-10 cigarettes;day; N equals 10; for 11-20 cigarettes/day, N equals 20; more than 21 cigarettes per day N equals 30. The difference between calculated and actual values was 0.2%. The minimum value of alpha is discussed.

28364

Inokawa, Takao and Michiko Taga

RELATIONS BETWEEN METEOROLOGICAL CONDITIONS AND DEATH. REPORT 15. (Kisho joken to shibo tono kankei. Dai 15 ho). Text in Japanese. Nippon Ika Daigaku Zasshi (J. Nippon Med. School), 37(5):376-382, Oct. 1970. 20 refs.

The relationship between weather (fine, cloudy, rainy) and death rates was examined by classifying 42,293 deaths according to date of death, sex, age, and cause of death. The death figures were for Tokyo residents who died between January 1, 1962 and December 31, 1962. In the examination, the death rate of 100,000 population/day was sought and an average daily death rate (i.e., a death rate index) according to weather category was obtained. Death rates in terms of weather were highest on fine days and loest on rainy days. Death rates in terms of age were higher on fine days than on rainy days except for the 35-45 yr group. Death rates were higher on cloudy than on rainy days, excepting 5-20 yr and 35-45 yr groups, but lower than on fine days. Death rates in terms of sex, judged from weather were always higher among males especially among young and old men. As to death rates in terms of causes, 81.37% had higher rates on fine and cloudy days. The death rate increased when fine weather continued to prevail but decreased during extended periods of cloudy or rainy weather. Deaths from bronchitis and bronchial asthma over fine days of clear weather were more than twice as high as on rainy days while deaths from influenza were seven times as high. The analysis of the variations of temperature in terms of weather indicated that the temperature range/day and the amplitude of temperature are greatest on fine days and that on fine days, the temperature is lowest in the hours (1-6 am) when the physiological faculty of man is lowest. These factors explain the high rates on death fine days.

28493

Tikhonov, G. P., G. M. Gorban', and Yu. B. Bizin

COMPARATIVE EXPERIMENTAL STUDY OF THE CONTINUOUS AND INTERMITTENT EFFECT OF CARBON TETRACHLORIDE ON THE MICROSTRUCTURE OF ANIMAL ORGANS. Space Biol. Med. (English translation from Russian of: Kosmich. Biol. Med.), 4(4):27-33, 1970. 3 refs. NTIS: JPRS 51641

The pattern and level of pathomorphological and histochemical processes that developed in the liver of white male rats exposed continuously (24 hr/day) and intermittently (six hr/day) to 0.5 mg/l carbon tetrachloride were proportional to total exposure time. Structural and metabolic disturbances developed in the liver three to four times sooner during a continuous exposure than during an intermittent exposure of the same total duration. (Author abstract modified)

28496

Fridlyand, I. G.

THE EFFECT OF INDUSTRIAL POISONS ON THE IMMUNO-BIOLOGICAL STATE OF THE ORGANISM. Gigiena i Sanit., 24(8):55-61, 1959. 28 refs. Translated from Russian, p. 149-157.

Immuno-biological reactivity of the organism is controlled by general physiological principles, and the state of the nervous system is a factor of considerable importance in general immunogenesis and in specific immunity manifestation. It is possible for the lowered immulogic reactivity of the organism resulting from some industrial poisonings. It is known that an anti-infection immunity can be hereditary, and individually acquired means of adaptation which resists the entrance into the organ of microbes and viruses, their proliferation, and the deleterious effects of their products of elimination. Such means of adaptation or barriers are presented by the skin and mucosa, inflammation, phagocytosis, the reticulo-endothelial system, the lymphatic tissue barrier functions, humoral factors, and the organism's cell reactivity. It is believed that each of the barriers can be disturbed by the effects of given poisons. Results of experiments and clinical observations found in literature present evidence of the relation existing between the effects of some industrial poisons and the fall in the bactericidal potency of blood serum. It is emphasized that in the sum total of the barriers' action as a phase of antibacterial immunity, they manifest a variety of mechanisms, one of which may be synergistic. Of particular interest are antibodies which change the microbes in the direction of involution, lowered virulence, and susceptibility to phagocytosis. Under present day conditions intoxication with low doses or low concentrations of the toxic agent are encountered most frequently.

28541

Szoelloesi, Erzsebet, Ferenc Medve, and Endre Jeney

THE EFFECT OF LOW CARBON MONOXIDE CONCENTRATIONS IN THE AIR ON HUMANS. PART II: PHYSICAL EXAMINATION OF WORKERS IN CAR REPAIR AND CONSTRUCTION WORKSHOPS. (Angaben zur Wirkung des niedrigen Kohlenmonoxyd-Gehaltes in der Luft auf Menschen. II. Teil: Untersuchung der Werktaetigen in Autoreparatur- und Montagewerkstaetten). Text in German. Zentr. Arbeitsmed. Arbeitsschutz, 21(3):69-74, March 1971. 25 refs.

The effect of carbon monoxide in ambient air was studied on two groups of auto mechanics: smokers and nonsmokers. The experimental conditions and methods were the same as described in an earlier paper. The average age of the examined workers was 28 years, 68.9% of whom were between 17 and 30 years. Blood pressure in the examined workers was 29% higher than in a control group. The carboxyhemoglobin content in the blood of smokers was on the average 2.38% higher after exposure to CO-containing air. Among nonsmokers, there was a 1.26% increase. In 4.4% of the smokers and 6.4% of the nonsmokers, the number of red blood corpuscles was below 3.5 million. Polycythemia was observed in 16.2% of the smokers and 10.7% of the nonsmokers. Hyperchromia was also very frequent.

28558

Fujita, Shinnosuke, Motoichi Tanaka, Shoji Kawame, Ichiro Yoshioka, Takashi Furuya, Shogo Shibata, Tatsuo Kosoda, Yokichi Fujiwara, Michiko Makita, Yoichi Ueda, and Hisakichi Tokuda

STUDIES ON CHRONIC BRONCHITIS--EPIDEMIOLOGICAL SURVEY (2ND REPORT). (Manseikikanshien no kenkyu--ekigakuteki kenkyu (zokuho)). Text in Japanese. Teishin Igaku (Med. J. Communication), 21(3):197-202, March 1969. 2 refs.

In 1967, an epidemiological survey on chronic bronchitis was carried out among 7817 male post-office workers in Tokyo, Tsurumu, and Kawasaki. The results were compared with those of the previous study in 1962. A questionnaire was filled by each employee; the responses were verified or amended by a personal interview with a doctor or trained nurse. Where necessary, an auscultation and percussion were performed. In diagnosing chronic bronchitis, the standards of Fletcher and Fujita (persistent cough and phlegm lasting more than one month and occurring every year for mory than two years) were applied. Of those surveyed, 20.6% and 5.8% had the symptoms of phlegm and coughing, respectively. Chronic bronchitis in accordance with Fujita's standard was recorded for 8.2% of the subjects twice as high as the percentage in 1962. However, with respect to gasping, there was little difference between the two tests. symptoms of chronic bronchitis in accordance with Fletcher's standard were exhibited by about 60% of the subjects, which is in accord with Fujita's standard. The rate of agreement between the two standards increased with increasing age. The incidence of chronic bronchitis was greater among employees working outside or living in center-city and industrial areas. In each of the three cities, levels of gases such as sulfur dioxide, nitric oxide, and nitrogen dioxide had increased since 1962. The observed increase in the incidence of chronic bronchitis is considered to be closely connected with the increased levels of pollution.

28559

Chiba Prefecture (Japan), Pollution Countermeasures Section

INVESTIGATION OF EFFECTS OF AIR POLLUTION AND WATER POLLUTION ON MEN. (Taiki osen oyobi suishitsu odaku no jintai ni ataeru eikyo chosa kenkyu). Text in Japanese. 104p., 1969.

With the cooperation of Chiba University, the Chiba Prefectural Government has been carrying on overall research on the public hygiene aspect of pollution. The studies cover chronic respiratory diseases and malignant lung tumors is citizens of Ichihara City; the photochemical reaction of sulfur dioxide and organic compounds; the photodecomposition reaction of nitrogen oxides in the atmosphere; lesions in respiratory organs caused by air pollutants; statistical studies of the relationship between respiratory diseases and air pollution; basic studies on methods of eliminating small amounts of harmful gases, actual air pollution levels in urban areas; medical survey of children three years old and less in Ichihara City; and epidemiological and clinical studies of bronchial asthma of children in Chiba Prefecture. Children in polluted areas tended to have more frequent colds than those in control area, especially one-yr olds and three-yr olds. The difference was significant. In the control area, children caught fewer colds as they grew older. This was not true of pollution areas. Among primary school children in Ichihara City, 3.3% of the boys and 2.6% of the girls (total, 2.95%) had asthma. In Chiba City, 0.75% of the boys and 0.36% of the girls (total, 0.56%) had asthma in 1964. In 1968 the figures were 1.56% for boys and 0.76% for girls, (total 1.17%).

28714

Toyama, Toshio and Shiro Adachi

DAILY DEATH AND URBAN ENVIRONMENT (IN TOKYO). (Kankyo to toshi no shibogensho (Tokyo-to ni okeru). Text in Japanese. Nippon Eiseigaku Zasshi (Japan J. Hyg.), 26(1):158, April 1971. (Presented at the Japanese Society for Hygiene, Annual Meeting, 41st, Tokyo, Japan, April 3-4, 1971.)

Daily death figures from April 1966 to March 1969 were obtained from 23 wards of Tokyo. Delta death-15dma (the difference between the daily deaths and the 15 days moving average (15 dma), used to eliminate seasonal variables was calculated. Then the correlation coefficient of delta death-15dma vs temperature and the degree of air pollution (sulfur dioxide concentration and floating dust) was investigated. Analysis of the data revealed that the correlation between daily deaths and the degree of air pollution was not high in general; no marked monthly tendency was present in the correlation between 15 dma and the degree of air pollution. On the other hand, a significant correlation was observed between daily deaths and temperature; the highest correlation was observed in August between 15dma and temperature. There was no significant difference between the correlation of delta death -15dma vs temperature and the degree of air pollution for the same day, for one day, two day, and three day lag.

28722

Tsunetoshi, Yoshizo

EPIDEMIOLOGICAL STUDY OF CHRONIC BRONCHITIS WITH SPECIAL REFERENCE TO EFFECT OF AIR POLLUTION. (Taikiosen to mansei kikanshien). Text in Japanese. Osaka Daigaku Igaku Zasshi (Med. J. Osaka Univ. Japan. Ed.), 20(10-12):367-386, Dec. 1968. 61 refs.

Levels of air pollution in Osaka were investigated according to the British Medical Research Council questionnaire. A total of 34,209 male and female inhabitants over forty years old and living in nine areas of varying air pollution received questionnaires. Respiratory function tests by oral diagnosis, chext X-ray tests, and vitalor were performed. Return rates of the questionnaires were 80.8 - 92.5%. The incidence of chronic bronchitis in both men and women increased with increasing age and the amount of smoking (the incidence in those who smoked more than 21 cigarettes daily was three or four times as high as for nonsmokers of the same age). A higher rate was shown in an area of high sulfur dioxide concentration. However, there was no correlation between rate of incidence and amount of falling soot. Model expressions to estimate the incidence of chronic bronchitis from age, the amount of smoking and levels of air pollution, and also the incidence of obstructive disorders in those suffering from chronic bronchitis from their age and the amount of smoking were obtained. Estimated values and actually measured values for both incidences were compared. The correlation coefficients were 0.98 and 0.97, respectively. The incidence of obstructive disorders was studied by dividing 2350 subjects who answered the questionnaire into 3 groups: those with chronic bronchitis (group I), those with injuries other than chronic bronchitis (group II), and those who showed no subjective symptoms such as coughing and sputum (group III). Rates decreased in the order of group I, II, and III. In each group, the incidence became higher with an increase in age and the amount of smoking. The results of this investigation were compared with those for Yokkaichi. Qualitative differences in air pollution in both areas have a different influence on the incidence of chronic bronchitis.

28733

Tokyo Metropolitan Public Nuisance Research Inst. (Japan)

REPORT OF SURVEY ON EFFECTS OF AIR POLLUTION ON MEN -- ON THE RELATIONSHIP BETWEEN MORTALITY AND DISEASES WITH AIR POLLUTION -- 1966-1968. (Taiki osen jintai eikyo chosa hokokusho - Tokyo tokubunai ni okeru shibo to shippei no taiki osentono kanren ni tsuite - Showa 41-43 nendo). Text in Japanese. 112p., March, 1970.

Tokyo is unique in that its population density is the greatest in the world; that 25 years ago, when home-heating was not dependent upon coal, there was no air pollution, and that air-pollution is now on an unprecedent scale. Information was collected from daily death records and a correlation with air pollution indicators (sulfur dioxide and dust) was sought. The Air pollution index in Tokyo equals 9.056 times SO2 concentration (pphm) power 0.631 + 5 times dust concentration (mg/cu m). Among people over 50 there are more deaths in winter than in summer. This seasonal change in mortality rate suggests that temperature is the biggest factor among environmental conditions. Daily mortality rate had only low correlation with factors of air pollution (SO2, dust, air pollution index) and no result suggesting a causal relationship was obtained. There is a positive correlation between mortality rate and high temperature, but it could not be established how much air pollution contributed to winter mortality rates. Further research is necessary on direct cause of death, contributing cause of death, the area where death occurred, and residence. In addition, representative measuring cites should be established throughout Tokyo to determine the relation between SO2 and dust and other pollutants and other meteorological factors.

28750

Watanabe, Hiroshi and Fusa Kaneko

EXCESS DEATH THROUGH THE AIR POLLUTION IN OSAKA CITY. PART III. (Taiki osendo ni yoru shiboshasu zodai ni tsuite. Dai-3-po). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 5(1):127, 1970. (Proceedings of the Japan Society of Air Pollution, Annual Meeting, 11th, 1970.)

Based on data obtained from November 1962 to October 1967, the relationship between air pollution and the variation in the number of deaths in Osaka Prefecture was investigated. The city of Osaka was designated as the polluted area and suburban Sonoda as the control area. Deaths (not due to external causes) increased when temperature decreased and degree of pollution was high. The deaths also depended on the absolute level as well as the change in the level of pollution. Deaths increased not only when sulfur dioxide concentration was over 0.1 ppm, but also at lower concentrations when the change in concentration was drastic. Similarly, deaths increased when suspended dusts exceeded 0.5 mg/sq m or at lower concentration if change in concentration was rapid.

28752

Nose, Yoshikatsu and Yoshimitsu Nose

AIR POLLUTION AND RESPIRATORY DISEASES. PART IV. RELATIONSHIP BETWEEN PROPERTIES OF AIR POLLUTION AND OBSTRUCTIVE PULMONARY DISEASES IN SEVERAL CITIES IN YAMAGUCHI PREFECTURE. (Taiki osen to kokyuki shikkan. Dai-4-po. Yamaguchi shotoshi no taiki osen no seijo to heisokusei haishikkan). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 5(1):130, 1970. (Proceedings of the Japan Society of Air Pollution, Annual Meeting, 11th, 1970.)

Residents over 40 years of age in the five cities of Ube, Onoda, Mine, Tokuyama, and Nanyo of Yamaguchi Prefecture were surveyed according to the BMRC method. In the primary survey, for all cities except Mine, a positive correlation was observed between sulfur dioxide concentration (mg/100sq cm PbO2) and the frequency of one type or another of respiratory illness, pulmonary function, and SO2 concentration. Similar results were obtained for settling dusts and chronic bronchitis. In addition a study of smokers and nonsmokers showed that smoking is not unrelated to respiratory diseases. However, in the secondary survey, there was a significant difference for respiratory illness of one kind or another between smokers and nonsmokers, but no significant difference for those having pulmonary damage. For polluted and nonpolluted areas, there was a significant difference between the three types of individuals: those having one type or another of respiratory difficulty, those having pulmonary function damage, and those having chronic bronchitis. It is concluded that the effects of air pollution cannot be satisfactorily described by comparison of polluted and nonpolluted districts alone; at individual differences in smoking habits must be taken into account.

28753

Takahashi, H. and Toshiro Nakajima

AIR POLLUTION EFFECTS ON HUMAN HEALTH IN TSURUSAKI DISTRICT OF OITA CITY. (Oita-shi Tsurusaki chiku ni okeru taiki osen no kenko ni oyobosu eikyo ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollu-

tion), 5(1):131, 1970. (Proceedings of the Japan Society of Air Pollution, Annual Meeting, 11th, 1970.)

Residents of the Tsurusaki industrial complex area in Oita City were studied for the relationship between health and air pollution caused by the complex since its establishment in 1964, Based on National Health Insurance records for the residents, statistics were compiled on the common cold, bronchitis, bronchial asthma, pneumonia, laryngitis and pharyngitis, tonsilitis, and emphysema. Tsurusaki industrial area (0.03 ppm SO2, annual average) had a much higher incidence of respiratory illnesses than an unpolluted area 4 km away.

28765

Yoshida, Katsumi, M. Takatsuka, M. Kitabatake, H. Oshima, and M. Imai

INHALATION EXPERIMENT OF SULFURIC ACID AEROSOL TO GUINEA PIGS. (Morumotto ni yoru ryusan misto kyunyu jikken). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 5(1):149, 1970. (Proceedings of the Japan Society of Air Pollution, Annual Meeting, 11th, 1970.)

The effects on guinea pigs of a long-term repetitive exposure (46 times over 23 weeks) to sulfuric acid mist were investigated. Sulfur trioxide evolving from heated acid was diluted by moist air and aerosols over 1 micron in size were removed by an impactor with an impinger. The average concentration measured by an electroconductivity method was 8.5 mg SO3/cu m. Albumin was given to some of the animals. Pneumatograms were recorded by means of a kymograph, and changes in the number of acidocytes in 500 leukocytes of blood samples was noted. The pneumatograms showed that for some animals, dyspnea became more severe as the number of exposures increased. For those given albumin, anaphylactic dyspnea was observed. An increase in acidocytes was also observed, although there were individual differences. Blood congestion in lungs as a result of SO3 exposure was also noted.

28767

Nose, Yoshikatsu, Kyoko Nose, and Kazuko Yoshisaki

AIR POLLUTION AND RESPIRATORY DISEASES. PART V. RELATIONSHIP BETWEEN AIR POLLUTION AND RESPIRATORY DISEASES AMONG 3-YEAR-OLD CHILDREN AND PRIMARY SCHOOL CHILDREN. (Taiki osen to kakyuki shikkan. Dai-5-ho). Taiki osen to sansaiji narabi ni jido no kokyukishikkan tono kankei). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 5(1):135, 1970. (Proceedings of the Japan Society of Air Pollution, Annual Meeting, 11th, 1970.)

The correlation between respiratory diseacs, especially the frequency of asthmatic attacks in infants (3-year-olds), children (6-12 yrs), and adults (over 40) and air pollution in the cities of southern Yamaguchi was studied. In the past six years, infant morbidity has increased in Nanyo. There was positive correlation between the frequency of respiratory illnesses and eczema and sulfur trioxide concentration. For Onoda, Ube, Tokuyama, and Nanyo, the frequency of asthma and other respiratory illnesses was high for children in first and second grades and decreased with increase in grades. Bronchitis and asthma were especially high in the urban areas. The frequency of respiratory diseases of children in the 31 districts of the four cities had a statistically significant correlation with air pollution. For the adults, the frequency increased with increasing age.

28768

Sugita, K., E. Hino, Masao Shishido, Katsumi Saruta, Mitsuo Watabe, and N. Kukegawa

RELATIONSHIP BETWEEN AIR POLLUTION AND SYMPTOMS OF RESPIRATORY SYSTEM ON CHILD. (Yoji no kokyukishojo to taiki osen tono kankei. Dai-1-po. Anketo ni yoru kenkochosa). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 5(1):134, 1970. (Proceedings of the Japan Society of Air Pollution, Annual Meeting, 11th, 1970.)

For an epidemiological study of the effect of air pollution on allergic symptoms and dysfunction in children, a preliminary questionnaire concerning children was conducted. Questionnaires were circulated to the guardians of 41,854 kindergarten pupils in Yokohama. The samples were divided into five areas delimited according to the isoquants of sulfur trioxide concentration. The actual response rate was 66.1%, although the general response rate was 81.5%. There was no correlation between SO3 concentration and susceptibility to cold, but clear relationships were seen between SO3 concentration and sore throat, eye irritation, asthma attacks in the past year, and susceptibility to rashes and allergic reactions. Similar results were obtained for SO3 and respiratory illnesses such as infantile asthma. Data according to the degree of pollution, age, and sex are tabulated for various items.

29235

Nakajima, Toshiro and Ichiro Hata

EPIDEMIOLOGICAL STUDY OF AIR POLLUTION EFFECTS IN SAGANOSEKI TOWN. (Oita-ken Saganoseki-cho ni okeru taiki osen no kenko ni oyobosu eikyo ni tsuiteno ekigakuteki kenkyu). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 5(1): 132, 1970. (Proceedings of the Japan Society of Air Pollution, Annual Meeting, 11th, 1970.)

Residents of the commercial-residential area of Saganoseki, adjacent to a copper refinery with a 295-m stack, were interviewed according to the BMRC method. The sample was 1257 residents, excluding highschool students and younger children; the response rate was 82.9%. Items on the questionnaires pertained to protracted (about three months) annual coughs; coughing and phlegm occurring since two or more years ago; bronchial afflictions in the last three years and past and present asthmatic attacks. The response rate for each item was classified according to sex. The results show that many people are suffering from the respiratory symptoms due to sulfur dioxide gas, and that morbidity in the area in almost as high as in Osaka or Kobe.

29249

Wokounova, D., K. Fried, and J. Sladek

THE RESULTS OF THE STUDY OF THE POLLUTED AIR INFLUENCE ON HEALTH OF THE KLADNO AND BUSTEHRAD INHABITANTS. THE 2ND COMMUNICATION. (Vysledky sledovani vlivu znecisteneho ovzdusi nazdravi obyvatel Kladna a Bustehradu Sdelni II). Text in Czech. Cesk. Hyg. (Prague), 15(6):196-202, 1970. 15 refs.

All ten year old children who lived in the areas of Kladno, Bustehrad, and Zlonice in Bohemia since their birth were medically examined and their past history of illnesses recorded. The results were grouped according to the environmental conditions under which these children lived. Three categories were established; group I, areas with a dust fall of over 500 tons per sq km per year and an average sulfur dioxide concentration around 0.5 mg/cu m, group II with a dustfall of 150-500 t/sq km/ year and an SO2 concentration of up to 0.15 mg/cu m, and group III with a dustfall up to 150 t/sq km/year and an SO2 concentration of up to 0.05 mg/cu m. It was shown that children living in very polluted areas have retarded growth and a greater morbidity rate for respiratory diseases exist. The reduction in ultraviolet radiance from dustiness and smoke in the air can cause a change in the form of symmetry of the thorax and faulty comportment of the body. Appreciable differences were found with children from groups I and II, compared with group III, with regard to erythrocytes count, hemoglobin values, color index, number of leucocytes, lymphocytes, and eosinophiles. There was no difference in serum protein level in all groups, and the rate of infectious diseases was practically the same in all three groups. Suppression of dustiness by using water curtains when dumping slag, the need for greening of older slag dumps, the general projects of dedusting and desulfurization of air, and increased electrification of interplant transportation are needed.

29255

Karimova, L. K.

THE CLINICAL ASPECTS OF GRANOSAN POISONING. Inst. of Hygiene of Labor and Industrial Diseases, Leningrad (USSR), 9p. Translated from Russian.

Several cases of poisoning due to the accidental use in food of grain treated with ethylmercurychloride were diagnosed among families of collective farm workers. The clinical picture presented by the disease was similar to that found in diethylmercurophosphate poisoning: patients exhibited gastrointestinal disorders, marked adynamia, general exhaustion, and functional disturbances of the central nervous system. The presence of the disease was confirmed by the continuous excretion of mercury in urine. A gradual improvement in the condition of the patients was noted following intravenous injection of glucose with vitamins B1 and C and subucaneous introduction of unithiol, a new synthetic preparation recommended as an antidote in cases of arsenic and mercury poisoning.

29256

Saita, G., L. Moreo, and G. Levizzani

THE BEHAVIOR OF DELTA-AMINOLEVULINIC ACID AND OF PROPHOBILINOGEN AFTER GLYCINE LOAD IN SATURNISM. Med. Lavoro (Milan), 58(331):364-369, 1967. Translated from Italian.

Because other tests are not always conclusive indicators of minor lead intoxication, a study was made of the behavior of delta-aminolevulinic acid (ALA) and prophobinogen (PBG) in saturnism, before and after glycine load. Prior to glycine load, two of the 10 cases studied had ALA serum values above the maximum normal limit and nine had ALA urine values above maximal normal limits. After glycine load, a noteworthy increase of the serum and ALA values was observed in all cases. No changes in PBG were found. In 10 normal subjects, no pathological ALA and PBG increases occurred in either urine or serum. It is concluded that glycine load not only makes an already existing metabolic change increasingly evident, but also permits the documentation of the changes in those cases of saturnism for which preliminary analyses failed to demonstrate any ALA changes.

29284

Stupfel, M.

EXPERIMENTAL BRONCHITIS PRODUCED BY VARIOUS AIR POLLUTANTS. (Bronchites experimentales par drivers polluants atmospheriques). Text in French. Bull. Physio-Pathol. Respir. (Nancy), vol. 5:485-504, 1969. 70 refs.

A study conducted in England with workers over 45 years of age showed that absenteeism and mortality due to bronchitis occurred at a higher rate with increased sulfur dioxide pollution. These studies also indicated a relationship between mortality from bronchitis and the dust content in the air. Another study conducted with English postal employees working outdoors, revealed an increased incidence of bronchitis during periods of fog and cold weather. Other aggravating circumstances in connection with bronchitis include tobacco smoking, and exposure in industrial plants to toxic gases and chemical irritations, such as chlorine, ammonia, and sulfurous anhydride. T determine the ill effects of air pollution on the respiratory system, tests were made with animals in whom experimental bronchopneumopathies were induced under controlled conditons. Two identical chambers were used into which an equal number of a species of animals of the same age sex and weight were placed for a period of time. The inside temperature and humidity in the chambers were kept at equal values. In one chamber a normal atmosphere is maintained whereas pollutants are introduced into the other chambers. Both groups of animals are periodically examined. The dusts and chronic effects of the exposure of various animals to seven groups of pollutants were reported. The animals used were rats, mice, dogs, rabbits, hamsters, and guinea pigs. The seven pollutant groups were sulfur dioxide, various nitrogen oxides, ozone, dust, tobacco smoke, automobile exhaust gases, and aerosols. A great variation of effects of the same air pollutant on different species of animals studied was found.

29423

Kiyoura, Raisaku

PROBLEMS ON AIR POLLUTION IN JAPAN. (Wagakuni no taiki osen no mondaiten). Text in Japanese. Jidosha Gijutsu (J. Soc. Automot. Engrs. Japan), 25(3):209-213, March 1971.

When sulfuric acid gas emissions increased due to increased consumption of petroleum fuels, the problem of suspended dust was overlooked although it is emitted in great quantities from the burning of such fuels. The dust is 0.1-10 microns in diameter, and stays aloft in the atmosphere from a few hours to a few years. When heavy oil is burned 48-95% of the dust is less than 10 microns in size. About 62-80% of the dust from automobile exhaust gas is less than 2.0 microns. The 0.1-1.0 micron particles are likely to be inhaled into the lungs and retained there. The rate of deposition is reported to be about 53%. It is also reported that when dust is 200 micrograms/cu m for the 24 hour average, there is a high incidence of respiratory disease complaints the following two days. Even when sulfuric acid gas is about 0.01 ppm, if the dust concentration is also high, ther are many complaints from respiratory disease patients. When smog continued for four days in December 1962 in Osaka, the dust concentration averaged more than 1000 microgram/cu m a day, and there was and an increase in the mortality rate. The sulfuric acid gas during this period was lower than the period before of after. When there is a high concentration of unsoluble substances in the dust, the mortality rate from bronchitis increases. When measures are taken to decrease the concentration, the mortality rate decreases markedly.

29453

Schaer, Meinrad

THE MAN AS BENEFICIARY AND THE PRAY OF TECHNICAL DEVELOPMENT. (Der Mensch als Nutzniesser und Opfer der technischen Entwicklung). Text in German. Staedtehygiene (Uelzen/Hamburg), 22(4):77-81, 1971.

With the random selection of high and low air pollution areas, a higher rate of chronic bronchitis is always found in highly polluted areas. In non-polluted areas, the rate of chronic bronchitis among male nonsmokers is 1% and among smoker 15%; in heavily polluted areas, it is 7% for non-smokers and 20% for smokers. As a study in Philadelphia shows, the morbidity rate is correlated with the wind direction, wind speed, smoke content, particulate concentration, and components of sulfur oxides. A negative correlation exists between air temperature and morbidity. However, none of these factors alone correlates with the morbidity. Sulfur dioxide affects the bronchi only in extremely high concentrations. Workers can inhale 5 ppm SO2 for eight hours per day without effect, while 1 ppm SO2 in the atmospheric air causes an increase of the bronchitis rate. A clear relationship also exists between the rate of lung cancer and the degree of air pollution. Carbon monoxide which is known as a dangerous toxic is present in the atmosphere in only small concentrations, even with heavy air pollution caused by smoke and automobile exhausts. Another disease which is strongly correlated with air pollution is asthmatic bronchitis. Some cities are known because of their high bronchial asthma morbidity, such as New Orleans asthma and Yokohama disease. The frequency of asthmatic attacks depends on the concentration of pollen and also on the content of sulfur oxides in the air. It is not influenced by pressure, temperature, or humidity of the air.

29571

Ardelan, I., M. Cucu, and E. Andronache

STUDIES OF THE SIGNIFICANCE OF DUSTS AND GASES FOR THE PATHOLOGY OF INFECTIONS OF THE RESPIRATORY TRACT. (Untersuchungen ueber di Bedeutung von Staeuben und Gasen fuer die Infektionspathologie des Atemtraktes). Text in German. Wiss. Z. Humboldt Univ. Berlin Math. Naturw. Reihe, 19(5):455-456, 1970.

Experiments were made to study the effect of dust and irritating gases on infections of the respiratory tract induced by experimentally introduced pneumococci and influenza viruses in white male mice. Silica dust, carbon dust, and calcium carbonate dust respectively were introduced into the nostrils together with the infectious agent. Only the infectious agents were applied to a control group. The dust caused extended duration of disease and an increased mortality rate. Of the three types of dust applied, silica had the most damaging effect. In another set of tests, mice were exposed for 7 hrs a day to 16 mg/cu m sulfur dioxide and 4 mg/cu m chlorine. After 21 days the same infectious agents were applied. Control animals were not exposed to the irritating gases. This influence of the gases was less pronounced in pneumococcal infections than in viral infections, where they produced an intensified occurrence of protracted pneumonia, and increased mortality. The effect of chlorine in this respect was stronger than that of SO2.

29575

Maziarka, S. and E. Mros.

ON THE RELATIONSHIP BETWEEN AIR POLLUTION AND MORBIDITY AND MORTALITY OF THE POPULATION IN POLISH TOWNS. (Ueber die Beziehungen zwischen Luftverunreinigung und Morbiditaet sowie Mortalitaet der Bevoelkerung in polnischen Staedten). Text in German. Wiss. Z. Humboldt Univ. Berlin Math. Naturw. Reihe, 19(5):483-484, 1970.

Statistical data were compiled in three large cities in Poland to study any relationship between the concentration of air pollutants and the incidence of illness or death; meteorological factors were also compared. As a rule, highest concentrations were observed to occur on calm days, whereas winds tend to dissipate pollutants. The number of recorded patients during favorable conditions of weather and purity of air were compared with those who fell ill during more polluted conditions. During the latter period the number of persons in Katowice and Chozov who developed diseases of the respiratory tract went up by 40%, and for cardiovascular diseases, by 13%. In Krakow the increase was 90% for patients with respiratory complaints, and 17% for patients with cardiac. A distinct rise in number of deaths in Krakow was observed on days of increased sulfur dioxide. When SO2 exceede a daily average of 0.2 mg/cu m, and the dust content at the same time was above 0.3 mg/cu m, the number of deaths rose by 32% during one test period. When the SO2 concentration rose above 0.3 mg/cu m, the mortality rate levelled off and no further increase was observed.

29589

Symon, Karel and Blahoslav Petr

THE INFLUENCE OF AIR POLLUTION ON PUBLIC HEALTH. (Der Einfluss der Luftverunreinigung auf die Gesundheit der Bevoelkerung). Text in German. Wiss. Z. Humboldt Univ. Berlin Math. Naturw. Reihe, 19(5):471-473, 1970.

Systematic and repeated examinations of groups of children from northern Bohemia who live in approximately equal climatic conditions and have comparable nutrition patterns, revealed that polluted air has an unfavorable influence on the growth and the development of children. Hemoglobin values drop while the globulin values in the blood plasma rise; enlarged tonsils were also observed. The findings are typical for air pollution of a general type, characterized by significant dust content and lack of ultraviolet radiation, but relatively low concentration of sulfur dioxide. In one area, polluted with arsenic, a greatly increased arsenic content was found in the hair and nails of the children. Lack of ultraviolet radiation appears to be specifically responsible for retardation in growth and development, for instance, in the maturing of the bone structure. An examination of young non-smoking women living in polluted areas revealed reduced vitality, faster rate of exhalation, pre-emphysematous condition, and in some cases coughing with expectoration of mucus. Toxic substances apparently either retard or stimulate normal metabolic processes; a substance in low concentration can stimulate an enzymatic system, but will inhibit it in higher concentrations.

29609

Bender, W., M. Goethert, G. Malorny, and P. Sebbesse

EFFECTS OF LOW CARBON MONOXIDE CONCENTRATIONS IN MAN. (Wirkungsbild niedriger Kohlenoxid-Konzentrationen beim Menschen). Text in German. Arch. Toxikol. (Berlin), 27(2): 142-158, 1971. 28 refs.

The uptake and psychological effects of carbon monoxide on healthy volunteers during and after exposure were studied. The subjects sat in a closed chamber continuously circulated with a mixture of air and CO. After 8 hours of breathing 100 ppm CO, a concentration of 93 ppm was measured in expiratory alveolar air, showing that diffusion equilibrium had not yet been reached. The highest concentration of carboxyhemoglobin measured under these conditions was 11.6 percent. It was calculated, by applying the law of mass action, that only within a limited range of CO ncentrations is there an approximate linear relationship between the CO concentration in expired air and the COHb content of blood. Any conclusions as to the COHb content of blood drawn from the known CO concentration of expired air, assuming a linear correlation between the two over a great range of concentrations, will be in error, since the relationship is really an exponential one. It was shown that exposure to 100 ppm CO for 2 1/2 hours caused a significant decrease in visual perception, manual dexterity, and ability to learn and perform certain intellectual tasks. The measured CO concentration is alveolar air was 55 ppm and the COHb level was 7.2 percent. (Author abstract modified)

29683

Fukuoka Prefectural Government (Japan)

THE RESEARCH FOR THE EFFECTS OF AIR POLLUTION ON THE HUMAN BODY. (II) THE RELATIONSHIP BETWEEN ASTHMA-LIKE DISEASES OF THE SCHOOL CHILDREN AND AIR POLLUTION IN KITAKYUSHU. (Taikiosen no seitai n oyobosu chosa kenkyu. (II) Kitakyushu-shi ni okeru gakudo no zensoku shikkan to taikiosen tono kankei). Text in Japanese. p. 293-337, March 1968.

The effects of air pollution on school children in Kitakyushu were investigated in November and December, 1967 using questionnaires about childrens respiratory symptoms based on the B.M.R.C. questionnaire. The rate of complaints about asthma-like symptoms, the prevalent rate of asthma-like diseases, and the clinical findings were obtained. Also, the practicability and reliability of the questionnaire were estimated. The questionnaires included asthma-like symptoms, the length of time lived in the district, and also economic and social elements. The 588 children of the Shiroyama elementary school at Yahata-ku (a highly-polluted distric with a yearly average dust fall for nine years of 65.6 t/sq km/day and a sulfur trioxide concentration of 1.043 mg/day/100 sq cm) and the 980 children of the Kirigaoka elementary school at Kokura-ku (a non-polluted district with a dust fall of 11.47 t/sq km/day, and a SO3 concentration of 0.534 mg/day/100 sq cm) were chosen as subjects for the investigation. The pulmonary function test and the allergen intracutaneous reaction test were carried out on the children who complained of asthma-like symptoms in the questionnaires. The rates of complaints about asthma-like symptoms were 12.93% among children at the polluted district and 6.46% at the non-polluted district, and the corrected prevalence was 10.20% among children of the pollution district and 5.53% among children of the non-polluted district. The children of the polluted district showed a rate about twice as high as that of the non-polluted district in both investigations. Thus, the questionnaire was effective for finding childrens asthma-like diseases. The results of clinical examination revealed that typica and slight symptoms or atypical ones were frequent in asthma-like diseases of the polluted district and that the tendency of eosino-penia to increase was not as frequent. Also, the positive rate of the allergen intracutaneous reaction test was low in atypical asthma. These results showed that air pollution was closely related to the rate of complaint about asthma-like symptoms and the prevealence rate of asthma-like disease in children.

29899

Dolgner, R., L. Pelech, H. W. Schlipkoeter, and P. Schmidt

THE STUDY OF THE POLLUTED AIR INFLUENCE ON CHILDREN S HEALTH IN RUHRDISTRICT. (Studium vlivu znecisteni ovzdusi na zdravotni sta deti v poruri). Text in Czech. Cesk. Hyg. (Prague), 16(23): 62-70, 1971. 13 refs.

Two groups of children were examined from Gelsenkirchen, an area with industrial pollution, and from Westerland/Sylt, a control region with a clean atmosphere. In both sexes of the exposed children, enlargement of cervical and submandibular lymph glands and tonsils, lower body height, lower values of hemoglobin, and depression of erythrocyte resistence was found. The girls especially showed lower erythrocyte count and belated bone maturation; and the boys showed lower HbE values. The results proved that the group diagnostic method can be used in other populations as well as in those for which it was originally intended. The results are internationally comparable.

29925

Funabashi, Shigeru, Tatsuya Hayashi, Toshiya Nishimuta, Yukitake Furuya, Toru Takayama, Masaru Mizoguchi, Nobukiyo Sakurai, Keiji Kishimoto, Yoshiko Muramatsu, Yoshio Takayama, Ryotaro Tochigi, Sekka Ryu, Shu Terashima, Junichi Ito, Tsuyoshi Toba, Misako Murata, and Masatsugu Kubo

STUDIES ON AIR POLLUTION AND BRONCHIAL ASTHMA. REPORT 1. (Taikiosen to kikanshizensoku ni tsuite. Dai 1 po). Text in Japanese. Nippon Shonika Gakukai Zasshi (Acta Paediat. Japan, Tokyo), 75(2):90-91, Feb. 1971. (Presented at the Japan Pediatric Society, Annual Meeting, 73rd, Tokyo, Japan, Nov. 22-23, 1970.)

The relationship between air pollution, especially sulfur dioxide and bronchial asthma was investigated on the basis of health examinations of school children conducted since 1968 at Fuji City, Shizuoka Prefecture. The city was divided into sections of high, medium, and low pollution according to graphs of SO2 levels. The morbidity rate for bronchial asthma was 2.42% in sections of high pollution, 1.5% in sections of medium pollution, and 0.88% in sections of low pollution. A similar correlation was shown in detection rates of 5 diseases of the upper respiratory tract. In the sections of high pollution graphs of the monthly average of the frequencies of asthmatic attack and levels of SO2 were almost parallel. The rates of recovery of asthmatic children were low in the sections where there was high pollution, and were in general in inverse proportion to the levels of SO2.

30148

Steiger, Herbert and Arthur Brockhaus

STUDY CONCERNING THE MORTALITY IN NORTH RHINE WESTPHALIA DURING THE INVERSION WEATHER CONDITIONS OF 1962. (Untersuchungen zur Mortalitaet in Nordrhein-Westfalen waehrend der Inversionswetterlage Dezember 1962). Text in German. Staub, Reinhaltung Luft, 31(5):190-192, May 1971. 8 refs.

During the inversion weather conditions of December 1962, which were accompanied by an increase in particulate and sulfur dioxide concentrations, an increase of the mortality in the Ruhr Valley occurred. It was assumed that the higher mortality rate was connected with the higher air pollution. For confirmation of this assumption, the mortality rate outside the Ruhr Valley was studied for the same period of time, namely for December 3 to 15, 1962. A significant, but a relatively lower increase, was only found in the Duesseldorf and Cologne regions. Further division according to districts did not give any clear results. A division according to areas of different population densities has shown an increase in the mortality rate in the densely populated areas. The results indicate that the higher death rate was due to the higher concentration of air pollutants.

30167

Miyamoto, Terumasa

ATMOSPHERE – SULFUR DIOXIDE. (Taiki – aryusangasu). Text in Japanese. Naika, 27(5):823-826, May 1971.

This report is concerned with the effects of sulfur dioxide on plants, animals, and humans. Sulfur dioxide enters plants through the stomata of leaves, damages cellular tissue, and turns leaves brown and ivory. Sulfur dioxide causes tissues to die and ciliary movement in bronchial tubes to stop in humans and animals. The long-term exposure of animals to 10 ppm SO2 slows down ciliary movement. High concentrations are very toxic, and SO2 effects the bronchi and lung more 24 hrs after exposure than right after the exposure. There is insufficient data on the effect of long-term exposure to SO2. However, it is known that the vitamin C content in digestive organs, the kidney, and the liver decreases and life expectancy decreases as the concentration increases. One ppm of SO2 increases the frequency of respiration and pulse; 10-20 ppm of SO2 irritates the throat (pharynx); and 300-500 ppm of SO2 causes toxic symptoms even for a short-term exposure. Regional epidemiologic studies have attempted to show quantatively that deterioration of lung function is due to air pollution. However, no significant difference in lung function for residents of polluted and nonpolluted areas was found.

30183

Tajima, Yoshio, Kyoko Shinohara, Hideo Kinebuchi, and Toru Yamauchi

THE INFLUENCES OF ATMOSPHERIC FLUORIC FLUORIDE POLLUTION UPON THE SKELETAL DEVELOPMENT OF SCHOOL CHILDREN. (Fukkabutsu no yoru taikiosen ga gakudo no kotsu seijuku ni oyobosu eikyo). Text in Japanese. Fukushima Igaku Zasshi (Fukushima Med. J.), 18(5-6): 185-189, Dec. 1968. 16 refs.

In K city, Fukushima Prefecture, the skeletal development of 506 boys and girls in the 5th, 6th, 8th, and 9th grades was examined by x-rays of their right arms. A region within two km from the aluminum refinery, polluted with fluoride (three to five ppb fluoride and 100 to 230 kg/sq km/month fluorine per atmospheric dust fall), and a town only slightly polluted by fluoride located six km away from the refinery were studied. The x-rays were classified according to the standard of the skeletal development determined by Greulich and Pyle. Comparative studies on region, sex, and school year were also done. Children in the polluted area were found a little behind in the development of carpal bones in the 5th and 6th grade and metacarpal and digital phalanx bones in the 6th grade. Low levels of fluorine in the air promote the skeletal development of 8 - 12 year old school children; however, in this study, such a tendency was not found. Such a tendency was found however, in the girls in the 8th and 9th grade in the junior high school in the polluted area. Thus, if fluorine had an influence upon the skeletal development, the influence is greater upon the smaller children, and varies according to the individual child. There was only a slight difference between the polluted area and non-polluted area. Therefore, pollution in this area does not have a serious influence upon the skeletal development of children.

30237

Nose, Yoshikatsu, Hiroo Uenol, and Masako Nakayama

THE RELATIONSHIP BETWEEN THE SYMPTOMS OF THE PATIENTS WITH OBSTRUCTIVE RESPIRATORY DISEASES AND AMBIENT AIR QUALITY STANDARDS FOR SULFUR OXIDES. (Heisokusei kokyuki kanja no shojo to iosankabutsu no kankyokijun tono kankei). Text in Japanese. Japan Industrial Medical Society, Japan Ind. Med. Soc. Meet. 44th, Tokyo, Japan, 1971, p. 154-155. (April 3-4.)

Since 1950, five cities in Yamaguchi prefecture (Ube, Onoda, Mine, Tokuyama, and Shinnanyo) have applied the Ube Method to control pollution sources based on mutual agreement of the regional society in accordance with the scientific data. In 1969, pollution was below 0.05 ppm/hr for 73.8% of the total hours throughout the year at Ube, 82.5% at Onoda, and 84.5% at Tokuyama. Although prefectural government authorities take a serious view of the ambient air quality standard for sulfur dioxide, they treat the effect of pollution due to fine particles lightly. According to epidemiologic investigations in some cities of the prefecture, the effects of pollution on the human body are apparent even when the sulfur oxide levels are below the standard. This indicates that not only the single effect of SO2 gas, but also the arithmetic or geometrical effects of SO2 gas and fine particles should be considered, and that the establishment of an air quality standard for fine particles is an urgent problem.

30310

Takayama, Otohiko

EFFECT OF AIR POLLUTION ON RESPIRATORY ORGANS. (Taikiosen no kokyuki ni oyobosu eikyo ni tsuite). Text in Japanese. Nichidai Igaku Zasshi (Nichidai Med. J.), 30(2):83-88, Feb. 1971. 23 refs.

Histological studies were made of the effects of air pollution on the trachea, the lung, and the upper respiratory tract. An epidemiologic study of the effect of air pollution on the upper respiratory tract was also conducted. Either phagocytal inflammation of the alveoli of the lung occurs, or the phagocytes accumulate in the pulmonary intestice, if particles remain in the alveoli when dust is inhaled. Whenever dust remains in the alveoli and the bronchioli, it brings about proliferation of the fiber. The extent to which contaminant particles remain in the lung is affected by various factors. In the case of an aerial contaminant, it varies according to the amount inhaled. Allergic contamination causes typical asthma-like changes. Pathological changes in the upper respiratory tract due to air pollution were observed; the effect of dust increased according to the order of the pharynx, the larynx, the trachea, and the lung. The effect of sulfur dioxide increased in the order of the pharynx, the trachea, the larynx, and the lung. With respect to objective findings observed macroscopically in the epidemiological investigation, the incidence of paranasal sinusitis, laryngitis, and pharyngitis were significantly higher in a polluted district than in a nonpolluted district. Also observed were the parts of the larynx and the pharynx where lesions were apt to occur more often. Finally, the movement of gargling water was observed by roentgeno-cinematography to determine whether gargling water could make the surface of the mucosa clean and which part of the pharyngeal cavity it reached.

30353

Yoshida, Katsumi

EFFECTS OF AIR POLLUTION ON HUMAN BODY. (Taikiosen no jintai eikyo). Text in Japanese. Kyoto Igakkai Zasshi (J. Kyoto Med. Assoc.), 20(2):19-25, March 1971. (Presented at the Kyoto Medical Association, Scientific Lecture Meeting, Sept. 19, 1970.)

A review of the health effects of sulfur dioxide, nitrogen dioxide, and carbon monoxide is presented. Sulfur dioxide is a a representative contaminant in Japan today. As a result of long-term exposure to SO2 at the present atmospheric concentration, an increase of inflammation, mainly bronchitis, has been reported by epidemiological and experimental research. Inhibition of ciliar movement of the epithelium cells in the bronchial wall is indicated as a reason for this increase. Also, the SO2 has a high degree of deposition and retention in the lungs.

There are not many areas where nitrogen dioxide is the overwhelming contamination factor, its epidemiological effects are not clear. From long-term exposure experiments using minute amounts of NO2, it was concluded that this pollutant may cause obstructive lung disease in the same way SO2 does. The influence of carbon monoxide is completely different from that of SO2 and NO2. Carbon monoxide has a strong affinity for the hemoglobin in the blood. Once CO has combined with hemoglobin, it is very difficult to release; it inhibits the action of Hb, thereby causing cerebral disorders. Carboxyhemoglobin is also harmful to the patient with ischemic heart disease. The environmental standard of CO should be made taking these factors into consideration.

30396

Miyamoto, Terumasa

AIR POLLUTION AND RESPIRATORY DISEASES. (Taikiosen to kokyukishikkan). Text in Japanese. Sanfujinka no Sekai (World Obstet. Gynecol.), 23(4):351-354, April 1971.

Historical examples of air pollution damage, various respiratory diseases influenced by air pollution, and the relationships between constitution and air pollution are described. Bronchial asthma, chronic bronchitis, vesicular emphysema, pneumoconiosis, and lung cancer are increasing in Japan and abroad. Among these diseases, bronchial asthma and chronic bronchitis are easily influenced by air pollution; the rise and fall of these symptoms are related to sulfur dioxide concentration and to dust fall. Chronic bronchitis has a connection with smoking, like vesicular emphysema and pulmonary fibrosis. The incidence of pneumoconiosis and lung cancer is higher in those who have many ooportunities for inspiring dust than it is in others. Allergies are also easily influenced by air pollution. In animal experiments if an antigen is inspired after the inspiration of air pollutants, sensitization via the airways is easily established. Though it is noted that alpha 1 - antitrypsin in the blood may take part in the crisis of vesicular emphyseam, the relationship between its quantity and the basic factor easily influenced by air pollution has not been clarified.

30468

Grieco, B., R. Pennarola, and P. Lamanna

HYSTO-AUTORADIOGRAPHIC STUDY OF THE DISTRIBUTION OF RADIOACTIVE LEAD (PB210) IN VARIOUS ORGANS OF RATS. (Studio istoautoradiografico sulla distribuzione del piombo radioattivo (Pb210) in diversi organi del ratto). Folia Med. (Naples), vol. 49:937-947, 1966. 8 refs. Translated from Italian, 12p.

The organs of rats injected with a radioactive lead isotope were studied by hystoautoradiographic techniques to determine cellular localization of the lead. Organ sections prepared on demonstration slides were spread with photographic fluid using the stripping method. After 30-45 days in which the fluid was exposed to the radiation emitted from the hystologic cross sections, the slides were developed and colored, and later washed. Results confirmed the findings of other investigators that lead diffuses rapidly in several organs, principally, in order of preference, in the liver, lungs, kidneys, and spleen. In the first few hours after injection the deposits of the radioisotope are massive. Several of the hystoautoradiographs of the liver suggest a deposition of the metal both inside and outside the cell.

30654

Ministry of Health and Welfare, Tokyo (Japan) and Osaka Prefectural Government (Japan)

INVESTIGATION ON THE INFLUENCE OF SMOKE AND SOOT DUST AND OTHERS IN 1967. (Showa 42-nendo baiento eikyo chosa). Text in Japanese. 171p., 1968 (?).

The influence of atmospheric pollution on school children was investigated. An elementary school in Osaka City was selected to represent a polluted area and an elementary school in Ikeda City was selected as the control school. A total of 528 children of the fourth and sixth grades from both schools were the subjects of the investigation. To have medical and otorhinolaryngological examinations three times a year, and to examine the relationship between the daily change of pollution and that of respiratory functions, investigations were made for five successive days. The amount of floating dust and sulfur dioxide in the air was measured since the day before the examination began. Three days prior to the examination, questionnaires were distributed and absences were noted. The parents of the children in the polluted area were mostly blue-collar workers, and those of the children in the contrasting school were mostly white-collar workers. A high rate of conjunctivitis and trachoma was observed among the children in the polluted area. No difference was found in absences. A high rate of sore throats, headache, and coughs was observed among the children in the polluted area. Concerning height and weight, the children in the polluted area were inferior, but no difference was found in growth rate. The examination of respiratory function, by means of a Vitalor, indicated no significant difference between groups of the same height. The examination of vital capacity showed no difference for one second; but children in the polluted area had lower capacity for 0.75 and 0.5 sec. The children of the polluted area showed an obviously lower rate of breathing capacity. The value of respiratory resistance showed a noticeable difference between the same grade children. The over-all five-day examination, however, showed no distinctive difference between the two groups.

31008

Shustov, V. Ya. and S. I. Tsyganova (Saratov)

ACUTE (GRANOSAN) INTOXICATION CLINIC. Kazan. Med. Zh., no. 2:78-79, 1970. Translated from Russian. Sanzare Assoc., Inc., Philadelphia, Pa., 4p.

Seventy patients from 17 to 56 years of age were observed to have food poisoning after having eaten sunflower seeds treated with granosan, a toxic pesticide. Early symptoms included weakness, pain in the oral cavity, a metallic after-taste in the mouth, sleepiness, and headache; later symptoms included deterioration of appetite, nausea, diarrhea, persistent headache, considerable fatigue, deterioration of memory, and weakness and pain in the extremities.

31009

Sroczynski, Jan and Boleslaw Piekarski

A PICTURE OF THE PROTEINS OF BLOOD SERUM OF RABBITS DURING PROLONGED LEAD POISONING. (Obraz bialek surowicy krwi krolokow w przewleklym zatruciu olowiem). Postepy Hig. Med. Dosw., no. 17: 603-608, 1963. 9 refs. Translated from the Polish. Leo Kanner Assoc., Redwood City, Calif., 8p.

An investigation was undertaken to determine the effect of prolonged lead acetate poisoning in rabbits on blood protein levels. Blood serum fractions were evaluated by spectrophotometry. In a majority of the animals, the drop in the total quantity of proteins was preceded by a rise in quantity during the first months of poisoning. From sectional observations, all animals were seen to have morphological changes in their liver cells. The degree of liver damage corresponded with the hypoproteinemia.

31016

Takata, M., Yozo Matsushita, Yoshizo Tsunetoshi, Hiroyuki Kitamura, Masamichi Hara, Daihachiro Koyama, Akio Horie, and Kenichi Ashida

AIR POLLUTION AND CHRONIC BRONCHITIS IN AKO CITY. (Ako-shi ni okeru taiki osen to mansei kikanshien ni tsuite). Text in Japanese. Hyogo-ken Eisei Kenkyusho Kenkyu hokoku (Rept. Environ. Sci. Inst. Hyogo Prefect.), no. 1:25-35, March 1970. 14 refs.

Ako residents over 40 years of age were surveyed concerning coughing, phlegm, dyspnea, and smoking, according to the BMRC method. Based on the results, those residents with subjective symptoms were more closely examined. The morbidity for chronic bronchitis (Fletcher s definition) increased with increasing rate of smoking and increasing age. Comparison of bronchitis morbidity for different areas, having sulfur dioxide values of above or below 0.2 mg/day/100 sq cm by the lead peroxide method, did not show any significant differences, although morbidity was high in the area having the value above the boundary value. Obstructive ailments were most frequent among the chronic bronchitis groups, followed by those suffering from other illnesses. For all cases, the frequency of obstructive ailments was related to smoking rate and increased age. With an increase of over one mg/day/100 sq cm of SO2 values, the morbidity for chronic bronchitis increases in Ako.

31046

Rubino, G. F., G. C. Coscia, G. Perrelli, and A. Parigi

ACTION OF THE GLUTATHIONE, THE GLUTATHIONE STABILITY TEST, AND THE ACTIVITY OF GLUCOSE-6-PHOSPHATE-DEHYDROGENASE IN SATURNISM. (Comportamento del glutatione, del test di stabilita del glutatione e dell attivita glucosio-6-fosfato-deidrogenasica nel saturnismo). Minerva Med., vol. 54:930-932, 1963. 21 refs. Translated from Italian. 9p.

The erythrocytic content of glutathione, glutathione stability, and glucose-6-dehydrogenase were evaluated in a group of subjects with lead poisoning. The decreased activity which was observed is interpreted in terms of the influence of lead on the erythrocytic oxide-reductive system.

31120

Nilsson, J. Lars G. and Hans Selander

AIR POLLUTION -- THE PROTECTIVE INFLUENCE OF VITAMIN E. (Luftfororeningar -- skyddande verkan av vitamine E). Text in Swedish Svensk Farm. Tidskr., 75(10):477-482, May 26, 1971. 9 refs.

Human activities account for only 0.05% of the total pollution in the atmosphere, but the concentration of these substances around large population centers poses a serious problem. The problems of photochemical smog, ozone, the nitrogen oxides, and certain hydrocarbons are reviewed. Experiments with rats deprived of Vitamin E in their diets indicates that these are considerably more susceptible to lung damage from a high concentration of ozone in the atmosphere than are control rats fed with a diet rich in Vitamin E. The apparent protective mechanism involved is the fact that nitrogen dioxide and ozone tend to destroy the Vitamin A in the body, which is vital to the normal functioning of lung tissues. The Vitamin E protects Vitamin A from destruction by NO2 or O3. The mechanism by which Vitamin E exerts its protective action against the influences of NO2 and ozone was studied. Preliminary results indicate that the main product of the oxidation of alpha-tocopherol (Vitamin E) is an open-ringed monomer with benzoquinone structure. This tocopherylquinone is one of the normal decomposition products of Vitamin E to be found in the human body. Thus Vitamin E would seem to protect the body from these strong oxidizing gases by reacting with them to form harmless metabolites.

31507

Folesky, H.

OBSERVATIONS ON BERYLLIUM GRANULOMA. Berufsdermatosen Aulendorf, 15(2):93-103, 1967. 31 refs. Translated from German. Scientific Translation Service, Inc., Santa Barbara, Calif., 14p., 1967.

The case of beryllium granuloma on the right ring finger of a young man was reported. The granuloma results from a cut by a glass fragment from a fluorescent lamp. Patch tests with beryllium sulfate (2%) and with beryllium nitrate (0.38, 0.19, 0.019, and 0.0019%) were positive. Regression of the swelling was at first observed with almost 2000 mg of prednisone. The condition became worse immediately after medication was stopped. The granuloma was removed surgically. Five years later the patch test was still positive. The clinical and functional results of the operation were very good. Repeated tests on a patient with beryllium salt solutions in order to follow the course of the disease may cause sensitzation. Excitation of the granuloma over corticosteroid therapy was recommended. (Author summary modified)

31613

Caujolle, F., N. P. Buu Hoi, Pnam Huu, M. Renson, and L. Lacassagne

COMPARED TOXICITY OF O-(METHYLSELENO) BENZOIC ACID AND OF O-(METHYLTELLURO) BENZOIC ACID. (Toxicite comparee de l acide o-(methylseleno) benzoique et de l acide o-(methyltelluro) benzoique). C. R. Acad. Sci., Paris, vol. 268:2807-2810, June 9, 1969. 2 refs. Translated from French. Leo Kanner Assoc., Redwood City, Calif., 6p., May 1971.

The toxicity of sodium salts of o-(methylseleno) benzoic acid and o-(methyltelluro) benzoic acid was studied by determining death percentages amomg mice over 24 hr as a function of various dosages of the sodium salts. Each dosage was studied for 20 male and 20 female mice. O-(methylseleno) benzoic acid was less toxic than o-(methyltelluro) benzoic acid, but quicker to act. At the 40% lethal (DL 40) dosage, death occurred one hour after injection; at DL 70 and DL 100, it occurred in less than 30 min. With the sodium salt of o-(methyltelluro) benzoic acid, death occurred only 12-24 hr after injection. Males and females showed no significant difference in susceptibility to the two substances. The mice did not exhibit a toxic reaction to the salts, and no specific cellular lesions due to toxicity were observed.

31619

Kobylanska, Maria, Danuta Rajewska, and Urszula Strzyzewska

CLINICAL STUDIES ON THE EFFECTS OF CADMIUM ON TEETH AND ORAL MUCOSA. (Badania kliniczne nad wplywem zwiazkow kadmu na uzebienie i blone sluzowa jamy ustnej). Czas. Stomatol., 21(8): 913-918, 1968. 4 refs. Translated from Polish. Leo Kanner Assoc., Redwood City, Calif., 9p., April 1971.

A study was undertaken to determine whether and what kind of influence cadmium compounds have on dentition, the periodontium, oral mucosa, and bone structure of the mandibular shaft among workers involved in the production of alkaline storage batteries. The majority of those studied suffered from oral dryness, while a significant number experienced a metallic taste. The dentition of the subjects was generally bad, and a comparatively large number of teeth had been removed. A yellow hyperchromatism of the teeth was observed in 41 of the 80 subjects, with a distinct relationship between the intensity of the hyperchromatism and exposure time. The condition of the periodontium was also unsatisfactory, but the condition of the oral mucosa did not deviate from the norm.

31620

Rosenkranz, A. and G. Weisennbacher

BORIC ACID POISONING IN THE NEWBORN. (Borsaeurevergiftung beim Neugeborenen). Wien. Klin. Wochschr., vol. 77:46-50, 1965. 12 refs. Translated from German. (Scientific Translation Service), Santa Barbara, Calif., 16p.

With the aid of a case report, the fatal course of boric acid poisoning is described in terms of its clinical and biochemical picture. The extremely widespread pediatric application of boric acid in solutions, salves, and powders, and the oral administration of boric acid for the treatment of thrush, lead one to expect significantly higher frequencies of boric acid poisoning than appear in the published literature. Bloody vomiting, diarrhea, convulsions, coma, oliguria, and anuria characterize boric acid poisoning, along with exanthema which is always intensely red. Diagnostic methods to be used in cases of suspected poisoning are mentioned.

31629

Eybl, V., J. Sykora, and F. Mertyl

THE INFLUENCE OF SODIUM SELENITE, SODIUM TELLURITE, AND SODIUM SULFITE ON THE RETENTION AND DISTRIBUTION OF MERCURY IN MICE. Arch. Toxikol., vol. 25:296-305, 1969. 20 refs. Translated from German. Mundus Systems, McGregor, and Werner, Washington, D. C., 11p.

The retention and distribution of mercury were studied in experiments with mice during a four week period following the intravenous administration of mercuric chloride (Hg--230) and the subcutaneous application of sodium selenite, sodium tellurite, and sodium sulfite. Both sodium selenite and sodium tellurite caused a long term retention of mecury in the organism and altered the distribution of mercury in the organs. Sodium sulfite did not influence mercury retention, and caused only insignificant changes in the distribution of mercury. The effect of these compounds depended upon the redox potentials. Sodium selenite and sodium tellurite are reduced in the organism, and form compounds of a colloidal nature with mercury which are retained in the organism. (Author summary)

31639

Reploh, H., W. Klosterkotter, and P. Einck-Rosskamp

ON THE QUESTION OF THE TOXICITY OF THE PRODUCTS OF SMOLDERING PLASTICS. Arch. Hyg. Bakteriol. (Munich), 150(5):393-405, Sept. 1966. 18 refs. Translated from German. 20p.

The increasing use of plastics raises the question of whether their thermal disintegration products, in case of a fire, would produce poisonous or irritant effects. A test installation for the smoldering of various plastics is described, which allowed animal experiments of the toxicity of the smoldering products. In wood smoldering, the predominate toxicological risk is from carbon monoxide, as was shown by carboxyhemoglobin determinations in rats. The toxic smoldering products of a polyester material, which have a strong irritant effect on the lungs, must still be chemically identified. (Author summary modified)

31665

Yoshizaki, Kazuko

TREND OF COMMUNITY HEALTH OF THE CITIZEN IN PETROLEUM CHEMICAL INDUSTRY CITIES AND ENVIRONMENTAL POLLUTION. PART 2. ECOLOGICAL STUDY OF THE RELATION BETWEEN THE TREND OF COMMUNITY HEALTH AND LIVING ENVIRONMENT OF INHABITANT TOKUYAMA CITY FROM A VIEWPOINT OF MORTALITY BY MAJOR CAUSES. (Sekiyukagakukogyotoshimin no hokendoko to kankyoosen. Dai 2 hen. Shuyoshiinbestu shiboritsu kara mita Tokuyamasimin no hokendoko to seikatsukankyo tono kankei ni tsuiteno seitaigakuteki kosatsu). Text in Japanese. Yamaguchi Sangyo Igaku Nenpo (Ann. Rept. Soc. Yamaguchi Ind. Health), no. 17:62-78, Dec. 1970. 19 refs.

Death records for 70,000 residents of Tokuyama City were analyzed to determine death rates for two categories of diseases: endogeneous, constitutional diseases (cerebral hemorrhage, cancer, and heart disease) and ectogeneous, infectious diseases (pneumonia and bronchitis). Further, the death rate for each category was compared with national death rates for the periods 1958-1969 and 1962-1965. The relationship between death rates and quality of soil, water, and air was considered. In Tokuyama City and throughout Japan, deaths attributable to ectogeneous, infectious diseases are declining while those due to endogenous, constitutional diseases are increasing. The tendency is especially noticeable in Tokuyama City. In all years, decrease in air pollution was associated with decreased mortality from pneumonia and bronchitis in two sensitive groups: infants and children up to four years of age and adults over 40 years. With respect to their influence on death rates, dust fall and sulfur dioxide are in direct proportion to each other.

31900

Nose, Yoshikatsu, Yoshimitsu Nose, Kitsuko Nose, and Kazuko Yoshizaki

RELATIONSHIP BETWEEN AIR POLLUTION AND THE INCIDENCE OF ASTHMATIC PATIENTS. (Taikiosen to zensokukanja hasseihindo tono kankei). Text in Japanese. Minzoku Eisei (Human Hyg.), 36(6):212-213, Nov. 1970. (Presented at the Japan Society of Race Hygiene, Annual Meeting, 35th.)

The relationship between air pollution and chronic obstructive respiratory disturbances was examined according to sex and age in three-year olds (15,000), six to 11 year olds (27,000), and adults over 40 (15,000) in five cities of Yamaguchi Prefecture: Ube, Onoda, Mine, Tokuyama, and Nanyo. The mortality rate for bronchitis decreased sharply as dust pollution was replaced by gas pollution. Less of a decrease was observed for mortality from asthma. The mortality rate of asthma relative to that of bronchitis is increasing yearly. A positive correlation was observed between the air-pollution level (volume of dust fall and sulfur dioxide concentration), medical histories and incidence of obstructive respiratory diseases according to city, district, age and sex, in subjects over 40.

32186

Friberg, Lars

THE MEDICAL BACKGROUND FOR THE RECOMMENDATIONS. In: Recommendations Relating to Norms for Sulfur

Dioxide Content in Open Air. (Rekommendationer rorande riktvarden for svaveldioxidhalt i utomhusluft). Swedish Government Air Pollution Board, Stockholm, Communication 6601, 1965 (?). Translated from Swedish by Scientific Translation Service, Inc., Santa Barbara, Calif., p. 3-9, 1967.

Studies show a correlation between the occurrence of diseases of the respiratory tract and the degree of air pollution. Pollutants exert their effect on the respiratory passages either directly on the mucous membrane or indirectly by way of various nervous centers or various physiological functions such as breathing frequency or breathing resistance. Damaging gaseous pollutants are sulfur oxides, nitrogen oxides, oxidizing agents, and aldehydes. The data on the effects of sulfur dioxide that can serve as a basis for recommending a medical norm derive from both experimental and epidemiological studies. Experimental studies relate to such fundamental questions as the mechanisms and relative toxicity of various substances. Epidemiological studies show that in the London disaster of 1952, a marked increase in mortality was observed after several days of a daily average sulfur dioxide level content of 75 ppm with local 48-hour values as high as 134 ppm. A two-hour SO2 value not to exceed 25 ppm and a 30-day value not to exceed 5 ppm is recommended.

32704

Shiraki, Hirotsugu

THE NEUROPATHOLOGY OF CARBON MONOXIDE POISONING IN HUMANS WITH SPECIAL REFERENCE TO THE CHANGES OF GLOBUS PALLIDUS. Shinkei Kenkyu No Shinpo (Advan. Neurol. Sci.), no. 13:25-33, April 1969. 7 refs. Translated from Japanese. Scientific Translation Service, Santa Barbara, Calif., 30p.

Autopsy findings are reported for carbon monoxide poisoning due to imperfect combustion of household gas or charcoal. The cases examined included nine of nonintermittent poisoning, four of incompletely intermittent poisoning, and five of completely intermittent poisoning. Pathological changes involving demyelination of the cerebral white substance (substantia alba) were common to all cases. In four of the nonintermittent cases and three of the completely intermittent cases, there were also obvious changes in the globus pallidus, one of the important centers of the extrapyramidal motor system. Among the completely intermittent cases, only one showed changes in the globus pallidus. Changes in the cerebral cortex were entirely absent in the incompletely intermittent cases, although they were present in two nonintermittent cases and one incompletely intermittent case. While not as pronounced as those of the substantia alba, changes in the globus pallidus are more closely related to the essential processes of carbon monoxide poisoning than changes in the cerebral cortex. This is because the frequency of the incidence of changes in the globus pallidus occupies a position midway between that of the changes in the cerebral white substance and those in the cerebral cortex.

32735

Mie Prefecture (Japan)

REPORT ON THE INVESTIGATION INTO THE EFFECT BY SMOKE AND SO ON. (Bien to eikyochosa hokokusho). Text in Japanese. 107p., 1968 (?).

Air pollution was investigated with respect to its effect on the health of school children. Pollutants were tested for traces of sulfur dioxide, sulfuric acid ion and mist, nitric acid ion, various metals (titanium, vanadium, manganese, iron, nickel, chromium, and lead), nitrogen oxides, hydrogen sulfide, aldehydes, aerosols, and particulates. Elementary school children in two polluted areas and two non-polluted areas were examined for respiratory function. Health investigation cards were distributed prior to the examinations. Chest X-ray and otorhinological examinations were given annually. Based on the medical histories, the rates of asthma and pneumonia in the children in polluted school districts were 7.5 and 2.4 times higher than those in nonpolluted districts. The rates for conjunctivitis and trachoma were also high and differed significantly for the polluted and nonpolluted districts. Complaints about sickness, sputum, eye, ache, and pharyngeal ache were 3.7-6.7 times more frequent for the polluted districts; the rate of absenteeism due to respiratory diseases was also higher. The respiratory function of children in the polluted school districts decreased 87% (56.3% was significant); respiratory tract resistance increased 47% on the average and there was blocking damage. The tendency increased annually. The rate of specific inflammatory findings in the pharyngeal parts was high for the polluted districts and also increased yearly. Data on meteorology, environment, and other medical inquiries made simultaneously are included.

32882

Shishido, Masao, Terumichi Sugita, Hideko Hino, Tokuji Saito, and Masaki Kobayashi

EFFECTS OF AIR POLLUTION ON THE HEALTH DISTURBANCES OF CHILDREN. (Syoni no kenko syogai ni oyobosu taikiosen no eikyo). Text in Japanese. Kanagawa-ken Koshu Eisei Gakkai-shi (Bull. Kanagawa Prefect. Public Health Assoc.), no. 17:32, March 1971. (Presented at the Kanagawa Prefecture Public Health Association Annual Meeting, 17th, Nov. 20, 1970.)

A survey was made of the health impairment of kindergarten children in Yokohama City and correlated with the pollution in the respective districts according to the following sulfur trioxide levels (in mg/day/100 cm PbO2): below 0.3, 0.3-0.5, 0.5-1.0, 1.0-1.5, and above 1.5. There was no correlation between the SO3 level distribution and sensitivity to colds. Complaints of eye trouble and sore throats increased with an increase in SO3 level. Males in thy 0.3-05 district and females in the 0.5-1.0 district had greater frequencies of sore throats. Significant differences in the frequencies of eye irritation were determined in the 1.0-1.5 district. Asthma, eczema, and urticaria were also discussed.

32914

Momose, Masato

EXPERIMENTAL STUDIES ON AIR POLLUTION: EFFECT OF SO2 ON SUSCEPTIBILITY TO RESPIRATORY INFECTION. (Taiki osen ni kansuru jikken teki kenkyu. Kokyuki kei saikin kansen ni taisuru SO2 no eikyo). Text in Japanese. Chiba Igakkai Zasshi (J. Chiba Med. Soc.), 47(2):145-154, July 1971. 30 refs.

Guinea pigs raised in a germ-free and conventional environment were used for experimental studies on the effects of air pollution. Two groups were exposed to 40 ppm of sulfur dioxide and treated with infectious bacteria (staphylococcus aureus). The number of bacteria inhaled into the lungs as an aerosol and eliminated were determined. The lung revealed a slight or middle interstitial inflammation. The guinea pigs developed symptoms of hemorrhagic bronchopneumonia. A group of guinea pigs inhaled silica particles prior to treatment with bacteria and exposure to SO2. The number of silica particles and their residue due to SO2 exposure increased in the wall of the alveorus pulmonis. Germ free animals were effected more than conventional animals, indicating an adaptive response.

32953

Truhaut, R. and Nguyen Phu Lich

A STUDY OF THE DISTRIBUTION IN THE ORGANISM AND THE RATE OF ELIMINATION OF THREE BORON DERIVATIVES IN VARIOUS FORMS OF EXPERIMENTAL INTOXICATION IN ANIMALS. (Etude de la repartition dans l organisme et du rythme de defixation de trois derives du bore au cours de diverses formes d intoxications experimentales chez animal). Ann. Biol. Clin. (Paris), 23(1-2):83-105, 1965. 20 refs. Translated from the French. Leo Kanner Assoc., Redwood City, Calif., 29p., May 1971.

Distribution in the organism and the rate of elimination of boric acid, potassium borotartrate, and 5-methyl 5-n-propyl 2-p-tolyl 1,3,2, dioxaborinane (MPTDB) were investigated. In acute or subacute poisoning in the rat, boron is very diffusible for all three compounds. While this diffusibility is also observed in short and long-term poisoning, localization in certain organs also occurs. Among the organs which retain the most boron are the liver, the kidney, the brain, and the adrenals. The localization in the kidney is of interest because of the impairment of renal function that occurs in acute or subacute poisoning by these compounds. Adrenal localization also is of interest since boric acid tends to form complexes with polyhydroxyl compounds which gives it the ability to inhibit the oxidation of adrenalin. Boron was found to cross the placental barrier, which explains the considerably diminished vitality of the offspring from mothers subjected to repeated ingested doses of boric acid. While the elimination of MPTDB is clearly much slower when administered in repeated doses, a considerable portion of the boron for the three compounds is rapidly eliminated in the urine.

33065

Takahashi, Hisao, Akio Ichinosawa, Tadahiko Shimizu, Yoshizo Tsunetoshi, and Toru Yasuda

AIR POLLUTION AND CHRONIC BRONCHITIS. (Taiki osen to mansei kikanshien). Text in Japanese. Nippon Kyobu Rinsho (Japan J. Chest Diseases), 29(8):591-601, Aug. 1970. 12 refs.

A questionnaire survey based on the BMRC method was conducted among residents of Osaka to determine the relationship between air pollution and chronic bronchitis as defined by Fletcher. For the survey, 829 persons over 40 years old were chosen at random. The morbidity for chronic bronchitis for each area, computed from the survey data, was corrected for age-group differences and cigarette smoking. The corrected morbidity for each area correlated with the concentration of sulfur dioxide measured in the area. For those patients with chronic bronchitis including asthma, the frequency of the daily increase in severity of the illness was correlated with the concentration of sulfur dioxide for each day. The rate of increase of severity increased rapidly over the maximum daily concentration of 0.3 ppm. The chronic bronchitis patients were further examined by the Vitalor method, and the frequency of obstructive difficulties based on the one-second rate tended to become higher with age and smoking.

33109

Osaka Municipal Office (Japan), Dept. of Hygiene

AN INVESTIGATION ON THE EFFECT OF AIR POLLUTION TO HUMAN BODIES. (PART 2). (Taiki osen jintai eikyo chosa. (Sono 2)). Text in Japanese. 27p., March 1970.

The effect of air pollution in Osaka on human health was investigated with respect to rates of absence for school children, mortality rate, and examinations of peak flow value and forced vital capacity. Sulfur dioxide and dust concentrations were determined. No correlation was determined between data on absenteeism at schools in industrial, commercial, and residential districts and the degree of pollution in the districts. The fluctuation of the number of absentees due to respiratory diseases (cough, bronchitis, pneumonia, asthma) corresponded with that of total absentees, but was not correlated with sulfur dioxide concentrations. The mortality rate, modified with respect to age, was calculated and compared for each district. Mortality decreased annually. A higher than average rate was determined at a seaside industrial district and infant mortality and deaths due to pneumonia and bronchitis were frequent.

33123

Nakamura, Ryuichi

AIR POLLUTION AND FEMALE - EPIDEMIOLOGICAL STUDY OF EFFECT ON MOTHERS AND THEIR NEWBORN OF AIR POLLUTION IN YOKKAICHI CITY. (Taikiosen to josei - Yokkaichi-shi no taikiosen ga boji ni oyobosu eikyo ni kansuru ekigakuteki kento). Text in Japanese. Sanka To Fujinka (Obstet. Gynecol.), 38(8):1029-1036, Aug. 1971.

Certain areas in Yokkaichi City were designated as polluted areas with high concentrations of sulfur dioxide which increased annually. Obstetric and gynecological studies were made with respect to respiratory diseases (colds and bronchitis) during pregnancy, nausea, late gestational toxicosis, determination of erythrocytes and hemoglobin, amount of hemmorrhage at delivery, frequency of obstetrical operations, rate of premature deliveries, placenta weight, and rate of still births. The new born children were examined to determine body weight, asphyxia, jaundice, abnormal body temperature, mortality, and malformation. The results differentiated significantly between cases from the polluted area and the non-polluted area. Respiratory infections during pregnancy, serious jaundice of the new born child, premature births, and still births had a high and significant incidence in the cases from polluted areas. Of high incidence but not statistically significant in the polluted area cases were anemia during pregnancy, premature deliveries, pyrexia and asphyxia of the new born child, malformations, and an increase in placenta weight.

33173

Committee of Mie Prefectural Medical Insurance on Public Nuisance (Japan)

A STUDY OF THE METHOD OF ADMINISTRATION OF RESPIRATORY DISEASES CAUSED BY AIR POLLUTION. (Taikiosen ni yoru kokyuseishikkan no kanrihoshiki ni kansuru kenkyu). Text in Japanese. 61p., March 1968.

The effects of air pollution on human health were determined epidemiologically in Yokkaichi City. Common cold, bronchial asthma, pharyngitis, preocular diseases, and death due to obstructive respiratory diseases increased. The increase in occurrences of pharyngitis, characterized by paleness of the pharynx posterior wall, lymphatic nodules, redness, swelling, and fragmentary cut of the epidermal blood vessel, and respiratory diseases with asthmatic attack was correlated to sulfur dioxide concentration. Based on toxicological animal experiments on exposure to SO2, congestion of the lung and hypertrophy of the muscular layer supporting the bronchial wall were determined along with abcess formation in the lungs of dead animals. Clinical findings for patients with obstructive respiratory diseases confirmed the overwhelming prevalence of bronchial asthma symptoms greatly correlated with air pollution. Based on statistical data of residence classified by months, the incidence of obstructive respiratory diseases in the Shiohama region was 5.89%, increasing to 10.38% in May. The incidence was greater for women than men and for those over 50 and under ten years old.

33230

Schmidt, B.

THE EFFECT OF CIGARETTE SMOKING ON THE EOG. (Einfluss des Zigarettenrauchens auf das EOG). Klin. Monatsbl. Augenheilk., 156(4):523-531, 1970. 22 refs. Translated from German. Translation Consultants, Inc., Arlington, Va., 14p.

The effect of cigarette smoking on the electroretinogram (ERG) and the electro-oculogram (EOG) is discussed. A cigarette with 1 g of tobacco usually contains 10 to 20 mg of nicotine and 0.3 to 3% volume of carbon monoxide, among other substances. In a cigarette with 1.5% nicotine, approximately 5 to 7.5 mg end up in the mouth. Approximately 60% is resorbed by the organism in the case of leisurely smokers, and up to 90% by persons who inhale deeply. The effects of nicotine on the nervous system, the peripheric circulation, the hormones which influence the blood pressure, intra-occular circulation, metabolism in the retina, and CO saturation are examined. Control experiments were performed on 18 nonsmokers and seven occasional smokers, all with perfect vision. Two unfiltered cigarettes were smoked as quickly as possible and inhaled. Tests were then made and pulse and respiration rate were measured. The average EOG curves showed that resting potential was 958 microvolts before smoking and 817 microvolts after two cigarettes. A rise in blood pressure was noted in 86% of the occasional smokers; 72% showed no change in pulse rate. Results of additional tests are included.

33291

Ogata, Masamichi

A POLYGRAPHIC STUDY OF SLEEP IN ACUTE CARBON MONOXIDE POISONING. (Kyusei ichisanka tanso chudokusho ni okeru suimin no porigurafuteki kenkyu). Seishin Shinkeigaku Zasshi (Psychiat. Neurol. Japan), vol. 70:825-836, 1968. 38 refs. Translated from Japanese. Translation Consultants, Inc., Arlington, Va., 32p.

A study of ten patients (five in the seriously ill group and five in the medium group), who were among the acute carbon monoxide poisoning casualties that resulted from a coal dust explosion, was made approximately 11 months after the disaster. Polygraphic records were made of their brain waves during natural sleep throughout an entire night. A total of four subjects, three in the serious group and one in the medium group, experienced sleep disturbances. The ratio of light sleep phase and the paradoxical sleep phase to the total sleep was high compared to normal individuals; the ratio of medium and deep sleep was low. The ratio of the deep sleep phase was lower in the serious group than in the medium group, while the paradoxical sleep phase ratio was higher. The sustained length of the paradoxical sleep phase was longer than that in normal adults; this tendency was more marked in the serious group. The cycling of the paradoxical sleep phase overall was not particularly anomalous. The amplitude of the rounded waves and spindle waves was generally low, as was the frequency of their appearance, which was more marked in the serious group. The trend in pulse rate and body movements was similar to that of normal adults. (Author summary modified)

33306

Komitowski, Dymitr

EXPERIMENTAL BERYLLIUM CONDUCTED BONE TUMORS AS A MODEL OF OSTEOGENIC SARCOMA. (Doswiadczalne berylowe nowotwory kosci jako model miesaka kosciotworczego). Chirurgia Narzadow Ruchu i Ortopedia Polska), 33(2):237-242, 1968. 8 refs. Translated from Polish. Leo Kanner Assoc., Redwood City, Calif., 9p., March 1971.

One gram of beryllium oxide (a carcinogen) in the form of a suspension in a physiological solution was given intravenously to 20 rabbits. The animals were observed together for 18 months from the beginning of the infection. In rabbits that survived for more than 15 months, bone tumors were observed in three cases. Histologically, all tumors were classified as sarcoma osteogenes. The tumors were highly malignant of the osteogenic sarcoma type, bringing metastases to the lungs. Histologically, they are distinguished by their considerable heterogeneity. A constant feature of all tumors obtained in a pronounced tendency of their cells to become differentiated in the direction of atypical osteoblasts. It appeared that the degree of osteogenesis occurs in tandem with the degree of malignancy. Independently of the marked inhibition of the activity of basic phosphatase in parenchymatous organs, the bone tumors observed indicated a high activity of basic phosphatase. Tumors developed histogenetically are connected with new connective tissue elements of the marrow which have the capability of becoming differentiated into osteoblasts.

33345

oosting, P. E.

THE REACTIONS OF THE RESPIRATORY TRACT ON EXOGENOUS STIMULI. II. (De reactie van de ademhalingswegen op exogene prikkels II). Text in Dutch. Tijdschr Soc. Geneesk., no. 49:463-469, 1971. 20 refs.

The reactions of the respiratory tract to exogenous stimuli were examined. The response of the respiratory tract and lungs to inhaled particles was mainly dependent on the area of deposition and retention. The effect of the stimuli was determined greatly by particle size and number. Inhaled particles and gases may interact; the effect of sulfur dioxide would be largely determined by the presence of other aerosols. The evoked response could be as nondirect as a sequela of resorption in the nasopharynx. Sequential exposure and smoking had a deteriorating influence on adequate physiological reactions.

33372

Horiuchi, Kazuya and Shunichi Horiguchi

A TRIAL TO ASSUME ABSORPTION AND EXCRETION OF LEAD IN THE HEALTHY JAPANESE POPULATION (REPORT 1). (Ippan kenko nihonjin no enshushi suitei no kokoromi (sono 1)). Text in Japanese. SangyoZggaku (Jap. J. Ind. Health), 13(5):64-65, Sept. 1971. 10 refs.

Based on previously reported data, tables of human lead intake from food and drink and lead content in human urine are presented; a graphic analysis of lead content in urine and lead absorption through the digestive tract, all classified according to various age groups is given. The amount of lead obtained by subtracting lead content via digestive system from the total lead content in urine may be assumed to be the amount which has been inhaled from the air without causing deposition of lead (lead surplus). Assuming that 50% of the lead quantity from the inhaled air was absorbed, a reverse calculation can be made in order to estimate the lead concentration in the air that does not cause deposition in the human body. Assuming the average air intake of the adult Japanese per day is 10 m3 and that of a child is 5 m3, cumulative air intake of each age group was used to divide the lead surplus and multiplied by two. According to this calculation, 1.5 to 4.4 micrograms/m3 is the amount of lead concentration in the air that does not cause lead deposition in the human body of adult Japanese between the ages of 40 and 50.

33447

Makhinya, A. P.

BIOLOGICAL EFFECTS OF SULFUR DIOXIDE AND PHENOL WHEN SIMULTANEOUSLY PRESENT ON THE HUMAN AND ANIMAL ORGANISM UNDER EXPERIMENTAL CONDITIONS. (Biologicheskoye deystviye sernistogo gaza i fenola pri ikh sovmestnom prisutstvii na organizm cheloveka i zhivotnykh v ek perimentals nykh usloviyakh). Text in Russian. In: Vop. Gig. Atmos. Vozdukha Naselennykh Mest. 1968. A. P. Shitskova (ed.), Moscow, Nauchno-Issledovatel skii Inst. Gigieny, 1968, p. 57-61.

The minimum sulfur dioxide and phenol concentrations sensed by olfactory organs when only one of them was present in the atmosphere were .87 mg/cu m and .022 mg/cu m, respectfully and .33 mg/cu m SO2 and .011 mg/cu m phenol when both were present simultaneously. The minimum concentration effecting light sensitivity of an eye and electric activity of brain was .44 and .011 mg/cu m SO2 and phenol, respectively. Combined effects of SO2 and phenol are close to sum of their individual effects. Thus when both SO2 and phenol are present in the atmosphere, their maximum instant concentration expressed as sum of fractions of maximum permissible concentrations of isolated substances, should be less than one. The resorptive effect of low concentrations of SO2 in the presence of phenol on white rats was studied by three months of continuous intoxication by inhalation. The atmosphere containing 1.5mg/cu m SO2 and .5 mg/cu phenol and .5 mg/cu m SO2 and .05 mg/cu m phenol caused considerable pathomorphological changes in white rats organism. Hence, when SO2 and phenol are present simultaneously in the air, the maximum permissible average daily concentration of SO2 and phenol expressed in fractions of the average daily maximum permissible concentrations of isolated substances is recommended to be less than one.

33527

Lund, Charlotte

THE EFFECT OF CHRONIC LEAD POISONING ON REPRODUCTIVE CAPACITY. Nord. Hyg. Tidskr., vol. 18:12-20, 1936. 16 refs. Translated from Swedish. Mundus Systems, McGregor and Werner, Washington, D. C., 11p.

The effect of chronic lead poisoning on reproductive capacity was reviewed. Cases of infant mortalities and miscarriages were presented. In one example, two cases of miscarriages in the wives of house painters were reported. The women first gave birth to healthy children before the husband became a painter, and a second gave birth to healthy children when the husband ceased being a painter. Both had signs of lead poisoning. A case was reported in 1896 where a woman married to a painter gave birth to two healthy children in the first two years of his being a painter; simultaneously with his showing signs of lead poisoning, she started a series of 15 miscarriages. In 1901, a woman married to a painter had 22 pregnancies, six ending with miscarriages, six with premature birth, and five children died in infancy. She had no history of lead poisoning. In 1906, the normal infant mortality rate in Lille was 8.2%, but among children of painters, 22.9%. It was apparent that the fathers working with lead may have a limited influence as compared with the mothers doing so. Individual animals tests performed in 1914 on rabbits and chickens showed that the progeny of a lead-poisoned male and a normal female were inferior to normal progeny. Of 13 married female lead workers in a printing shop in 1896, having 56 pregnancies, there were 26 miscarriages, nine premature births, one stillbirth, 21 living births at term, and 17 dead shortly after. Other studies showing similar results are reported.

33868

Tejning, Stig

THE PROBLEM OF MERCURY IN SWEDEN. (Kvicksilverfragen i Sverige). Preprint, Swedish Dept. of Agriculture, 1965, p. 80-91. Translated from Swedish. Scientific Translation Service, Santa Barbara, Calif., 19p. (Presented at the Swedish Department Agriculture, Conference on Mercury, 1965.)

The effects of metallic quicksilver, an inorganic mercury salt, and the alkyl mercury compounds are compared. In 1953, cases of a mysterious nervous disease began to appear among the population of the city of Minamata, Japan. The suspicion that it could be alkyl mercury poisoning was confirmed when the patients were found to be excreting mercury in their urine for the first five months after becoming ill. Further investigation revealed that a chemical plant which used mercury compounds as catalysts had released waste products into the Minamata Bay, and several types of fish subsequently were found to have a high mercury content. Feeding experiments were conducted with six month old white leghorn hens which were given 12.5, 25, and 50% Panogen treated grain. In the groups whose feed contained 25 and 50% Panogen, both food consumption and egg production decreased. Alkyl mercury poisoning in wild pheasants is also discussed.

33903

Lob, Marc

ON LEADED GASOLINE II. COMPARATIVE STUDY ON THE LEVELS OF LEAD IN THE BLOOD, URINE, NA DPORPHYRINURIA IN VARIOUS POPULATION GROUPS OF LAUSANNE (OFFICE WORKERS, GARAGE WORKERS, POLICEMEN). (A propos de la benzine au plomb. II. Etude comparative de la plombemie, de la plomburie et de la porphinurie chez divers groupes de la population lausannoise (employes de bureau, garagistes, agents de police). Text in French. Z. Praeventivmed., 10:172-179, May-June 1965. 20 refs.

The lead content in blood and the lead and porphyrin content in urine of office workers (40 individuals), and of garage workers (50 individuals) was compared with respective levels in identical worker groups ten years ago (1955/56). The median lead content in the blood of the two population groups was 29 gamma % and 37 gamma %, respectively. In ten especially exposed policemen, 38 gamma % lead was in the blood, however this group was not tested 10 years ago. The levels in office and garage workers exceeded respective levels found 10 years ago by approximately 15 gamma %. Porphyrinuria was not diagnosed in any of the tested individuals. Median lead urine levels found were 24.5 gamma/l in office workers, 37 gamma/l in policemen, and 36 gamma/l in garage workers. The maximal permissible level for urine is 80 gamma/l, 50 to 80 gamma/100 cu cm for blood.

34148

Schlipkoeter, H. W.

THE EFFECT OF AIR POLLUTION ON HUMAN HEALTH. REPORT ON THE PRESENT STATUS OF RESEARCH. (Wirkung von Luftverunreinigungen auf die menschliche Gesundheit. Bericht ueber den Gegenwaertigen Stand der Forschung). Text in German. Ministerium fuer Arbeit, Gesundheit, und Soziales des Landes Nordrhein-Westfalen, Duesseldorf (West Germany), 20p., 1970. 18 refs.

Fine atmospheric suspended dust reduces ultraviolet radiation and thus reduces its ability to destroy carcinogenic substances and to stimulate synthesis of vitamin D in the human body. Fine dust can itself contain carcinogenic 3,4-benzopyrene and can adsorb chemical substances from the atmosphere and transport them into the lungs. An accumulation of fine dust in the atmosphere can therefore lead to acute impairment of health, as proven by increased mortality during smog episodes (1952, 1962). Measurements have shown that fine particulates increased in concentration in the Ruhr region the 1965-1969 period. A comparison of two groups of children, one living in the polluted atmosphere of Gelsenkirchen and the other in the unpolluted atmosphere of Westerland/Sylt, showed retarded bone maturation, especially in the Gelsenkirchen girls. Whether this is attributable to the tenfold concentration of SO2 and H2SO4 in Gelsenkirchen or to the climate has not been determined. In another study, persons exposed to low concentrations of dichloromethane manifested a considerably reduced ability to concentrate compared with a control group. Some noxious substances like derivatives of ethyleneimines cause genetic damage by increasing the spontaneous rate of mutation, considerably exceeding such damage caused by radiation. Such substances causes chromosomal damage at concentrations far below their toxic threshold concentrations.

34190

Nose, Yoshikatsu

SUDDEN AIR POLLUTION AND RESPIRATORY DISEASES. (Toppatsuteki taiki osen to kokyukikei kanja). Text in Japanese. Naika, 21(5):851-849, May 1968. 19 refs.

The correlation between a sudden increase in sulfur dioxide concentration due to an accident in a chemical factory in Ube City and the increase in symptoms of discomfort, respiratory diseases, and deaths was investigated. Concentrations of SO2 and dust particles, temperature, humidity, and wind direction and velocity were determined and plotted for monthly variations. Epidemiologic studies determined a definite parallel between the rise in SO2 concentration and dust and the increase in number of patients. Most patients suffered from quasi-influenza of the upper respiratory tract, which constituted 95% of the cases of respiratory illnesses among babies. Cases of bronchitis decreased and bronchial asthma and pneumonia increased among the aged. Death rates rose from 3% in June to 14.1% in July-August, with a marked increase on the days following the rise in SO2 concentration. Daily examinations determined a definite reaction (higher temperatures and pulse rates) of chronic respiratory and lung tuberculosis patients to air pollution.

34443

Schlipkoeter, H. W., J. Bruch, A. Brockhaus, and G. G. Fodor

THE EFFECTS OF SOLID, LIQUID, AND GASEOUS POLLUTANTS ON THE LUNGS. (Die Lunge als Aufnahmeorgan fuer feste, fluessige and gasfoermige Immissionen). Text in German. Praxis Pneumol., 25(9):505-518, Sept. 1971. 19 refs.

Regulations stipulating maximal permissible concentrations of solid, liquid, and gaseous pollutants must take into consideration whether the pollutants are deposited in the lung, absorbed into the blood stream or cause direct damage to the pulmonary system. Animal experiments and electron microscopic examination of the submicroscopic structure of pulmonary tissues are described designed to determine the parameters influencing pulmonary resorption. Epithelial-alveolar cells are of crucial importance in these studies. In one experiment, the pulmonary resorption of a fine oil aerosol, designed to simulate the behavior of particles soluble in benzene, was determined by determining silicon dioxide in the lung and the mediastinal lymphatic nodes 16 hours, five days, and four weeks following inhalation. Pulmonary resorption was a very complex phenomenon which depends on the penetration power of the particles, their deposition in alveoli their bronchial and lymphatic elimination, particle solubility, and their cytotoxicity. About 95-98% of the sulfur dioxide is retained by the alkaline mucus of the upper respiratory tract; it penetrates into the lung only when adsorbed on the surface of dust particles or when it is catalytically converted to a sulfate-ion aerosol. Non-reactive gases and vapors penetrate the lung by diffusion with the resorption degree proportional to the gas concentration and duration of exposure. Carbon monoxide is also mentioned.

34528

Kandus, J. and Z. Jurica

THE INFLUENCE OF SO2 ON THE INCIDENCE OF LOWER RESPIRATORY WAYS DISEASES. (Vliv kyslicniku siriciteho na incidenci chorob dolnich cest dychacich). Text in Czech. Cesk. Hyg. (Prague), 16(4/5):135-140, 1971. 34 refs.

The relationship between respiratory disease morbidity rate and degree of sulfur dioxide pollution was studied in a sample comprising 3547 men and women. The acute respiratory morbidity rate was significantly higher not only on the days with increased levels of SO2 concentration, but also during the two days following the exposure. A relationship was not found between morbidity rate and outdoor temperatures. High concentrations of SO2 were recorded during November and December, which were in agreement with high morbidity rates. (Author summary modified)

34644

Oshima, Hidehiko, Masayuki Imai, and Katsumi Yoshida

EXPERIMENT ON CHRONIC TOXICATION DUE TO INHALATION OF SULFUROUS GAS. EXPERIMENT ON GROWTH OF MOUSE IN THE CONTAMINATED AREA AND CONTROLLED AREA. (Aryusangasu kyunyu ni yoru manseichudoku jikken. Osenchiku taishochiku deno mausu no seicho kansatsu jikken). Text in Japanese. In: A study of the administration method of medical care for sufferers from public nuisance in Yokkaichi City. Committee of Mie Prefectural Medical Insurance on Public Nuisance (Japan), p. 57-59, March 1970.

Fifteen rats were reared since September, 1969 at the Isozu district in Yokkaichi City where air pollution was most severe. Ten rats reared at the University in Tsu were used as controls. The rats were raised outside and were killed after six months, one year, and a year and half. Average concentrations of pollutants in Isozu were: 0.140 mg/day/100 sq cm nitrogen and 1.269 mg/day/100 sq cm. sulfur dioxide. According to histological findings, lung congestion, neutrocytes around the bronchus, infiltration of lymphocyte, and emphysemtous changes were observed among the rats raised six months in Isozu. Among the rats reared one year in Isozu, emphysematous change on the lungs was obvious, and infiltration of inflammatory cells in the interstice was observed. Among the rats reared a year and a half in Isozu, pulmonary emphysema and cell infiltration of interstice were observed. Among the rats reared one year and a half in Tsu, no significant changes were observed except for lung congestion, slight cell infiltration of the interstice and spleen congestion. In conclusion, six month exposure between September and February caused bronchitis and a year and a half exposure causes pulmonary emphysema.

34945

Alekseyeva, O. G.

EXPERIMENTAL STUDY OF THE INFLUENCE OF PULMONARY NUCLEOPROTEIN SENSITIZATION OF THE INTEN-

SITY OF THE CURTIS SKIN TEST IN BERYLLIOSIS. (Eksperimentalnoye izucheniye vliyaniya sensibilizatsii nukleoproteidami legkikh na vyrazhennost kozhnogo testa Kurtisa pri berillioze). Academy of medical Sciences, Moscow (USSR), Inst. of Labor Hygiene and Occupational Diseases, 1967 (?). 3 refs. Translated from Russian. Leo Kanner Assoc., Redwood City, Calif., 9p., March 1971.

Sensitization of guinea pigs with nucleoproteins derived from the lungs of rats with experimental berylliosis specifically increases the intensity of the intradermal Curtis test with 2.5-3 micrograms of beryllium chloride, induced through allergy to the complex of beryllium plus auto-protein. The greatest activating effect is produced by a combination of delayed hypersensitivity to both antigens. This suggests that the Curtis test in berylliosis patients is related not only to the sensitization by the beryllium plus protein complex, but also to the influence of auto-allergic processes. (Author summary modified)

35134

Blundi, Edmundo

AIR POLLUTION AND ITS ACTION UPON THE RESPIRATORY SYSTEM. (Poluicao atmosferica: acao sobre o aparelho respiratorio). Text in Portuguese. Rev. Brasil. Med., 28(6):247-251. June 1971.

The impact of air pollution upon the population and measures to be taken in fighting air pollution are discussed. Industrial emission sources, automotive vehicles, and open air burning of refuse are the main contributing factors to air pollution in Brasil. No scientific proof defining specific diseases induced by air pollution had been found so far. However, air pollution may worsen pre-existing conditions in patients with bronchitis, asthma, emphysema or cardiopulmonary conditions which constitute the major part of victims due to pollution. Graphs representing the parallelism between smoke and sulfur dioxide concentrations in the air and the exacerbation of pulmonary disease in groups of patients held under control are reproduced. A program of preventive measures including early diagnosis and treatment of pulmonary disease should be developed. Complex teams including clinical physicians, lung specialists, allergists, and specialists in nuclear medicine should be established to prevent air pollution-induced episodes. Technical measures should be taken to prevent industrial, automotive, and other burning emissions.

35153

Ii-izumi, Osamu and Yutaka Mori

HISTOPATHOLOGICAL STUDIES OF PARANASAL SINUSES OF GERM-FREE GUINEA PIG EXPOSED TO SULFUR DIOXIDE GAS (SO2). (Aryusan gasu (SO2) bakuro mukin shiiku morumotto no hara fukubiku no byori soshikigaku teki kenkyu). Text in Japanese. Nihon Jibi Inkoka Gakkai Kaiho (Jap. J. Nephrol.), 74(9):1358-1362, Sept. 1971.

Germ free guinea pigs were used for an experiment to study the effect of sulfur dioxide on the upper respiratory tract, especially paranasal sinuses. Ten germ-free guinea pigs were continuously exposed to 40 ppm of SO2 for two to 18 days from 10 days after birth. Their pathology of paransal sinuses was compared with that of 11 germ-free pigs reared under conventional conditions. Mucous membranes of paranasal sinuses of the guinea pigs not exposed to SO2 were in a static or silent state, which proved that no reaction occurred against stimulus. Since pus was seen in all the nasal sinuses of guinea pigs exposed to SO2, and desquamation of epithelium was observed in the mucous membrane of the respiratory tract, the mucous membrane probably undergoes necrosis from higher concentrations of SO2. Hyperemia and congestion of blood vessels and neutrophils were observed which proved acute inflammation. Hyperplasia of mucous membrane, increase of inmature cells, and infiltration under mucous membrane were not seen. A long-term experiment under low concentrations is necessary for a more accurate air pollution study. Changes were found in the respiratory tract; no difference was seen in the paranasal sinuses of the two groups of guinea pigs. Although the mucous membrane of human sinuses is anatomically different form that of guinea pigs, SO2 would probably be toxic to human bodies, judging from the fact that acute inflammation is caused by SO2 and that patients with paranasal sinuses diseases frequently come from contaminated districts.

35154

Funabashi, Shigeru, Tatsuya Hayashi, Toshiyuki Nishimuta, Nobukiyo Sakurai, Masaru Mizoguchi, Keiji Kishimoto, Toru Takayama, Yoshiko Muramatsu, Ryotaro Tochigi, Yoshio Takayama, Katsumi Yamada, Akira Sato, Sekka Ryu, Shu Terashima, Tsuyoshi Toba, Junichi Ito, Misako Murata, Suzuko Uehara, Seiji Kubo, Masao Matsumura, Kozo Ito, Motoaki Adachi, Ken Motomiya, and Ryo Yoshida

AIR POLLUTION AND INFANTILE BRONCHIAL ASTHMA. REPORT 1. ON THE PREVALENCE OF ASTHMA IN A POLLUTED AREA. (Taikiosen to shoni kikanshizensoku. Sono 1: osenchiku no zensoku hindo ni tsuite). Text in Japanese. Shonika Shinryo (J. Pediat. Pract.), 34(11): 1422-1428, Nov. 1971. 41 refs.

Health examinations were undertaken on infants and schoolchildren in Fuji City, a highly polluted area in Shizuoka prefecture. The correlation between the prevalence of infantile asthma and air pollution is discussed. According to sulfur dioxide levels, Fuji City was divided into a highly polluted area (SO2 mean concentration in a year was 0.05-0.07 ppm), an intermediate area (0.03 - 0.05 ppm), and a low pollution area (below 0.03 ppm). Schoolchildren were selected elementary schools in the three areas by a questionnaire or nurse-teacher, and diagnosis of asthma was ascertained by detailed examinations. Fujinomiya City, adjacent to Fuji City, was selected as the control area. The prevalence value of asthma in schoolchildren in 1968 was high in the highly polluted area; however, a statistically significant difference was not recognized between this area and the other two areas. The prevalence of asthma in children in the highly polluted area in 1970 was about three times that in the lowest polluted area, and its difference was significant. The prevalence of asthma in the intermediarily polluted area showed a medium value between the highes and lower polluted areas. A significant difference was statistically reocognized between the highly and intermediarily polluted areas. The prevalence of asthma curve in the lowly polluted area intended to become lower as the grade increased, while the curve in the highly polluted area showed two peaks in the third and fourth grades. The difference between low and high values was remarkable. The prevalence of infantile asthma was investigated on 325 infants in two highly polluted districts in Fuji City. Its prevalence was five or ten times that in the Ichihara district in Chiba prefecture. Thus, the prevalence of asthma in each grade of children in Fuji City is highest in the polluted area, and it has a tendency to keep pace with SO2 concentrations.

36259

Frontczak, Andrzej

THE EFFECT OF THE KIND OF RESPIRATION AND OF THE AIR IRRITATING THE RESPIRATORY TRACT ON THE VITAL CAPACITY OF THE LUNGS. (Zachowanie sie

pojemnosci zyciowej pluc w zaleznosci od rodzaju oddychania orz w srodowisku powietrza drazniacego drogi oddechowe). Preprint, Third Clinic of Internal Diseases A. M., Lodz (Poland), p. 592-593, 1961. (Presented at the TIP, 21st Meeting, Warsaw, Poland, Sept. 14-16, 1961. Translated from Polish. Scientific Translation Service, Santa Barbara, Calif., 6p.

Vital capacity of the lungs was determined by a Barnes spirometer in a group of 88 healthy persons, 58 men and 22 women, between 18 and 30 years of age. Three methods were employed: the vital capacity of the lungs was measured in the classical way, with the open nose; with a closed nose; and while the person investigated made the deepest inhalation through his nose while having his mouth closed, and the deepest exhalation through his mouth, having his nose closed. The vital capacity of the lungs determined by Method II was, on the average, smaller by 360 cu cm than the capacity determined by the classical procedure. In another part of the experiment, fifty healthy men were exposed to an environment which contained hydrogen sulfide before calculating vital capacity. The observed reduction of the lung vital capacity in an environment of air irritating the respiratory tract is real and statistically significant.

36809

Nose, Yoshikatsu, Sekio Ueno, and Masako Nakayama

AIR POLLUTION CONTROL AND ITS EVALUATION OF THE SEVERAL CITIES IN YAMAGUCHI PREFECTURE. (Yamaguchiken shotoshi no taiki osen taisaku to sono hyoka). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 6(1):199, 1971. (Presented at the National Council Meeting of Air Pollution Studies, 12th, Nagoya, Japan, Oct. 27-29, 1971.)

The effect of air pollution on human health was evaluted from the viewpoint of immunogenetics. Data obtained at several cities in Yamaguchi Prefecture during 1945-1969 were analyzed in terms of the pollutant concentration and mortality rate. The components of the deposited particulate matter were classified into two groups, soluble and insoluble substances, and analyzed in relation to the mortality rate by bronchitis, asthma, and heart diseases. The plottings of the corrected mortality rate versus the year and the amount of soluble or insoluble substances showed remarkable correlation. The mortality rate was also analyzed in relation to the degree of atmospheric pollution (SO3 in deposited particulate matter/square root of the amount of precipitation). Using the data obtained during 1960-1969.

36812

Council for the Living Environment (Japan), Div. of Public Nuisance

DETERMINATION OF AIR POLLUTION BY PARTICULATE SUBSTANCES AND THEIR EFFECT ON MAN. (Fuyu-ryushijo busshitsu ni yoru taiki osen no sokutei to hito eno eikyo). Text in Japanese. 106p., June 1971. 122 refs.

Environmental contamination by particulate substances was studied including the condition of air pollution by particulates, their effects, and their measurement methods. The particulate substances studied were less than 10 micron in diameter. Principal reports of studies on particulate substances, the concentration of particulate substances, the effects of co-existing substances, and environmental standards in foreign countries, were studied based on the literature. The concentration of particulate substances should always be determined under the conditions: the average value for 1 hr in 24 hr is below 100 micrograms/cu m; and the value for any 1 hr is below 200 micrograms/cu m. These conditions should be regularly checked and amended according to the result. The effects of sulfur dioxide are also discussed.

36923

Plotnikova, M. M.

BASIC INVESTIGATIONS FOR THE DETERMINATION OF THE LIMIT OF ALLOWABLE ACROLEIN CONCENTRATION IN ATMOSPHERIC AIR. In: Limits of Allowable Concentrations of Atmospheric Pollutants. V. A. Ryazanov (ed.), Book 4, Washington, D. C., U. S. Dept. of Commerce, 1960, p. 59-72. 10 refs. (Translated by B. S. Levine.) NTIS: TT61-11148

Threshold levels of acrolein perception were determined to help in setting maximum allowable limits of concentration. The threshold level of its odor perception was 0.8 mg/cu m for most sensitive persons. The thresholds of acrolein reflex effect on optical chronaxy was at 1.75 mg/cu m, on rhythm and amplitude of respiratory movement at 1.5 mg/cu m, and on eye sensitivity to light at 0.6 mg/cu m. Based on these data, the proposal for maximum allowable concentration in the ambient air was set at 0.3 mg/cu m. The present level established for working areas (two mg/cu m) caused irritation of the conjunctive and nasal mucosa, lowered eye sensitivity to light, and elicited changes in the rhythm and amplitude of respiratory movements. Air quality measurements in the area around oil drying plants determined concentrations of acrolein in excess of the allowable limits even at 1000 m from the plant. (Author conclusions modified)

36924

Takhirov, M. T.

BASIC PRINCIPLES FOR THE DETERMINATION OF ALLOWABLE CHLORINE CONCENTRATION IN THE ATMOSPHERE OF INHABITED LOCALITIES. In: Limits of Allowable Concentrations of Atmospheric Pollutants. V. A. Ryazanov (ed.), Book 4, Washington, D. C., U. S. Dept. of Commerce, 1960, p. 31-49. 13 refs. (Translated by B. S. Levine.) NTIS: TT61-11148

The atmosphere in the neighborhood of a chemical processing plant and the city of Moscow was monitored for concentrations of chlorine to help in determining maximum allowable concentrations for inhabited areas. The air of the plant was continuously polluted with chlorine and the air of the city contained a continuous supply of free chlorine even at comparatively great distances from the source of discharge. Chlorine was correlated with meteorological variables. The effect of chlorine on human health was investigated. The threshold of chlorine odor perception for sensitive persons was 0.5 mg/cu m. The threshold of chlorine effect on reflex activity as determined by changes in eye sensitivity to light was identical. Thresholds as determined by respiration and optical chronaxy were 1.5 mg/cu m. The maximum allowable concentration adopted by the USSR was 0.1 mg/cu m, a value considerably below the established thresholds. (Author conclusions modified)

36927

Bushtueva, K. A.

THRESHOLD REFLEX EFFECT OF SO2 AND SULFURIC ACID AEROSOL SIMULTANEOUSLY PRESENT IN THE AIR. In: Limits of Allowable Concentrations of Atmospheric Pollutants. V. A. Ryazanov (ed.), Book 4, Washington, D. C., U. S. Dept. of Commerce, 1960, p. 72-79. 6 refs. (Translated by B. S. Levine.) NTIS: TT61-11148

The threshold reflex effect of simultaneous sulfur dioxide and sulfuric acid aerosol exposure was investigated to recheck the standard limits for the simultaneous presence of two or more pollutants. The simultaneous inhalation of SO_2 and H_2SO_4 aerosol in above-threshold concentrations elicited reflex changes in eye sensitivity to light and in optical chronaxy which approximately equaled the sum of changes resulting from individual exposure to the pollutants. The simultaneous effect in concentrations equal to the allowable concentrations (0.05 and 0.03 mg/cu m) on the curves of adaptation to darkness or in the optical chronaxy curve on man was nil. The synergistic effect of simultaneous exposure was active only in concentrations exceeding the maximum allowable limits. (Author conclusions modified)

36928

Borisova, M. K.

MATERIALS FOR THE DETERMINATION OF LIMITS OF ALLOWABLE CONCENTRATIONS OF DICHLOROETHANE IN ATMOSPHERIC AIR. In: Limits of Allowable Concentrations of Atmospheric Pollutants. V. A. Ryazanov (ed.), Book 4, Washington, D. C., U. S. Dept. of Commerce, 1960, p. 49-59. 26 refs. (Translated by B. S. Levine.) NTIS: TT61-11148

The effect of dichloroethane on human health was investigated with respect to threshold concentrations to determine values for maximum allowable concentration limits. Dichloroethane vapor threshold odor perception was 23.2 mg/cu m for most persons and 17.5 mg/cu m for highly sensitive persons. The threshold effect of the vapor concentration on the functional state of the optic analyzer was 60 mg/cu m; concentrations of 6.0, 9.0, 12, 17.5, 23.2, 25, 30, and 50 mg/cu m lowered the sensitivity of the optical analyzer to stimulation by light. Tests of the threshold effect of dichloroethane on vascular reactions and respiration (6.0 mg/cu m) determined the maximum allowable concentration at 4.0 mg/cu m. (Author conclusions modified)

37229

Kettner H. and A. Hampel

POLLUTANTS IN THE AIR AND THEIR EFFECT ON THE HUMAN ORGANISM. (Schadstoffe in der Luft und ihre Einwirkungen auf den menschlichen Organismus). Text in German. Wasser Luft Betrieb, 15(12):441, Dec. 1971.

Exposure of the human organism to lead concentrations of 1 microgram/cu m air causes, in the long run, an increased discharge of coproporphyrin, i.e., in effect a disturbance of the metabolism. A similar effect is achieved by a carbon monoxide concentration of 2 mg/cu m. Concentrations of Pb and CO of the above magnitude are found in the atmosphere more than 50% of the time. The present methods of ventilation of homes and offices are ineffective, so such concentrations are also found indoors. The Institute of Climatology is presently conducting measurements, which are at the moment limited to sulfur dioxide, CO, Pb, aerosols, and aldehydes, for determination of the pollutant concentrations in the air which begin to affect the well being of man.

37337

Kaburagi, Sukekata, Gen-ichi Tokita, and Misa Matsumura

RELATION BETWEEN RESPIRATORY DISEASE AND AIR POLLUTION IN FUJINOMIYA DISTRICT OF SHIZUOKA PREFECTURE. (PART I). (Shizuoka-ken Fujinomiya chiku ni okeru kokyuki kei shikkan to taiki osen tono kankei ni tsuite no chosa (Dai 1 po). Text in Japanese. Nippon Koshu Eisei Zasshi (Japan. J. Public Health), 18(10):423, 1971.

Patients which colds, acute bronchitis, asthma bronchiale, bronchitis with asthmatic attacks, chronic bronchitis, pharyngitis, and allergic rhinitis in Fujinomiya City and Shibakawa-cho were examined during March 1969 and February 1970. These two districts are contiguous to Fuji City where serious air pollution is caused by many paper manufacturing factories. During the investigation, monthly average concentration of sulfur dioxide was 0.023 - 0.037. Morbidity of acute bronchitis in these districts was lower than that of Fuji City, but bronchitis with asthmatic attacks was the same as in a non-polluted district of Fuji City. Though the effect of air pollution of Fuji City was clearly observed in Fujinomiya City a correlation between meteorological conditions, observed at the same time, and occurrence of respiratory diseases was not found.

37504

Oshima, Hidehiko, Masayuki Imai, and Fukiko Kawagishi

AIR POLLUTION AND MORTALITY IN YOKKAICHI DISTRICT. (Yokkaichi chiiki ni okeru taiki osen to shiboritsu ni tsuite). Text in Japanese. Nippon Koshu Eisei Zasshi (Japan. J. Public Health), 18(10):424, 1971.

Deaths in Yokkaichi District from 1961 to 1969 were classified according to death certificates by year, area, cause, age, and sex; comparison between polluted and non-polluted areas and the correlation with air pollution were investigated. In the polluted area compared to the non-polluted areas, the mortality due to malignant neoplasm tended to be high; the mortality due to damage on blood vessels of the central nervous system tended to be low. In mortalities due to total heart diseases, total tubercular diseases, and pneumonia, the difference between both areas was not clear. While the mortality due to bronchial asthma decreased year after year since about 1966 in the non-polluted area, it tended to increase year after year in the polluted area; on the average in 1967 and 1968, a significant difference at 5% risk was evident. The correlation between mortality due to obstructive respiratory diseases and sulfur dioxide from 1967 to 1969 was significant at a risk of 5%.

37505

Tsunetoshi, Yoshizo, Tadahiko Shimizu, Ryuichiro, Suzuki, Miyoko Ueda, Noriko Nakayama, Yasuyo Yamagata, Katsumi Yoshida, Hidehiko Oshima, Masayuki Imai, Toru Yoshida, Motoaki Adachi, Fumihiko Akai, and Katsuhiko Tsujioka

EFFECT OF AIR POLLUTION TO SCHOOL CHILDREN. PART I. (Taiki osen no gakudo ni taisuru eikyo. (Dai 1 po)). Text in Japanese. Nippon Koshu Eisei Zasshi (Japan. J. Public Health), 18(10):420, 1971.

The effects of smoke and dust were investigated for five years since 1965 with respect to school children in Chiba, Mie, and Osaka (nine schools with a total number of children of 23,048) and the data were examined. Respiratory function tests with children of non-polluted schools (average value of sulfur dioxide) measured by the lead dioxide method from January 1964 through April 1968 was below 0.3 mg/day/100 sq cm) in each prefecture were determined for forced vital capacity (Y) measured by Vitalor as indicated by the following formula where body height is expressed as X and age as Z: Y equals (0.44 + 3.01Z)X - 345.22Z + 1379.88 in boys, and Y equals (0.44 + 3.01Z)X - 345.33Z + 1244.12 in girls. The difference between the values obtained from the above calculation and actual measurements was within the range of observational errors both in boys and girls. It was found that 1, 0.75, and 0.5 second rates decreased with the increase of height in all grades and both sexes. Mean values of SO_2 measured by PbO_2

method as an index of pollution were divided into four groups such as 1.0, 0.5 - 0.9, 0.1 - 0.4 and below 0.1 mg/day/100 sq cm. As a result of calculation in each group, the difference between actual and expected values of forced vital capacity became larger and the frequency of values below the expected one increased with an increase of pollution level. The difference of mean values of timed vital capacity corrected for height between polluted and non-polluted schools became larger with an increase of pollution in the case of pollution level over 0.1 mg/day/100 sq cm.

376200

Fel dman, Yu. G. and T. I. Bonashevaskaya

ON THE EFFECTS OF LOW CONCENTRATIONS OF FORMALDEHYDE. (O deistvii malykh kontsentratsii formal degida na organizm). Hyg. Sanit. (English translation from Russian of: Gigiena i Sanit.), 36(5):174-180, May 1971. 15 refs. NTIS: TT 71-50122/2

Human subjects were tested for the effects of brief exposure to formaldehvde, and albino rats were tested for the effects of long-term exposure. Reflex changes in the human organism were evaluated by determining olfactory thresholds and the effects on cerebral biopotentials (with electroencephalograms). In 7 of 15 subjects, the minimum detectable and subliminal formaldehyde concentrations were 0.0073 and 0.054 mg/cu m, respectively. The remaining subjects had higher thresholds. In five of the subjects with the lower thresholds, 0.04 mg/cu m formaldehyde had no effect on cerebral bioelectric activity. However, 0.053 mg/cu m formaldehyde produced statistically reliable changes in all five subjects. Inhalation of 1 mg/cu m (the maximum permissible concentration in industrial air) and 3 mg/cu m formaldehyde by abino rats for three months produced mild cytological and cytochemical alterations in the liver and brain against a background of moderate hyperemia. There was also a syndrome of intensified functional activity of the thyroid gland and adrenals, which is the morphological equivalent of the development of adaption processes in an organism exposed to adverse environmental factors. Exposure to 0.012 mg/cu m formaldehyde (the mean diurnal MPC for atmospheric air) produced no detectable changes in the animals.

H. EFFECTS-PLANTS AND LIVESTOCK

00408

M. Kehren

(INDUSTRIAL MEASURES FOR THE MAINTENACE OF PURE AIR AND WATER.) Industrielle Massnahmen zur Reinhaltung von Luft und Wasser. Textilveredlung (Basel) 1(5):219-227, May 1966. Text in Ger.

The general problem of air and water pollution in chemical plants in Germany is reviewed. The large-scale development and construction of air and water pollution control devices at the Hoechst AG Dyeworks, Frankfurt-am-Main, is described in detail. (Author summary)

01557

M. J. Bossavy

CANKERS CAUSED BY FLUORINE). (LES NECROSES DUES AU FLUOR.) Pollut. Atmos. (Paris), 8(30):176-184, June 1966.

The shape, color and evolution of cankers caused by fluorine, according to the stage of development reached by the leaf for a certain number of leafy and resinous plants are described. Cankers caused by fluorine may be confused with the effects of cold, dryness or insect attacks, and very close observation is needed to avoid such confusion. Pen drawings showing differences between cankered parts and healthy parts are included. (Author summary)

02041

L. de Cormis

(COMPARISON OF THE ACTIONS OF SULPHUR DIOXIDE AND FLUORINE COMPOUNDS ON SOME PLANTS.) Action Comparee de l' Anhydride Sulfureux et des Derive Fluores Sur Quelques Vegetaux. Proc. (Part I) Intern. Clean Air Cong., London, 1966. (Paper VI/5. pp. 173-3.

Sulphur dioxide and fluorine compounds are well-known polluting agents. In many industrial areas in France they are the cause of appreciable damage to the surrounding vegetation. The appearance and the morphology of the burns vary according to the polluting agent involved; moreover, the climatic conditions have a preponderating influence on the extent of the damage observed. The absorption rates of the two polluting agents have been studied and there is an important difference between the two gaseous pollutants. After having been absorbed, sulphur dioxide and the fluorine compounds behave differently in the plant. This may be explained by the fact that sulphur is a normal metabolite of the plant, whereas the fluorine ion is irrelevant to it and does not therefore take part in any normal metabolic process. It accumulates in certain definite parts where it could cause necroses when a certain level has been overstepped. (Author abstract)

02049

J. Bossavy

(THE ACTION OF GASEOUS FLUORINE COMPOUNDS ON FOREST SPECIES.) Action des Fluorures Gazeux Sur les Especes Forestieres. Proc. (Part I) Intern. Clean Air Cong., London, 1966. (Paper VI/13). pp. 193-6.

Very close study of vegetation makes it possible to reduce a pollution by examining only the canker or burning which this examination shows occurs on the vegetation around the station- herbaceous flowers, shrubs and trees. The time at which such a programme should start must be judiciously decided. The possibility of proceeding with sampling and analysis of leaves or (pine) needles remains. It appears that in the USA the tendency is to establish a single pollution by chemical analysis of the air which, incidentally, does not provide information on the damage caused to plants and animals. In the USSR, on the contrary, Dr. Izmerov takes examination of vegetations as the basis for determining air quality. The author thinks that this latest type of study requires sustained attention, and sense of observation, extensive knowledge of vegetable biology, and of the kinds of attack to which various vegetable forms are liable. It makes it possible to place diagnosis of pollution-by fluorine (compounds) on firm basis. (Author abstract)

02541

(SCIENTIFIC METHODS AND TECHNIQUES TO DECREASE THE POLLUTION OF THE ENVIRONMENT, THROUGH INHALATION OR INGESTION, AND OF ACOUSTICAL 'NUISANCES.') Moyens scientifiques et techniques de diminuer la pollution des milieux inhales ou ingeres et des 'nuisances' acoustiques. (Chapter 3: Les pollutions et 'nuisances' d'origine industrielle et urbaine. Tome 1. Leur prevention et les problems scientifiques et techniques qu'elle pose en France.) Premier Ministre, Delegation generale a la recherche scientifique et technique. June 1966. pp. 47-59.

The functioning of chlorophyll in the course of photosynthesis in leaves of plants serves as a method of air purification of sufficient importance to consider its use in control. Vegetation, like men and animals, can sustain a considerable amount of damage to the point where the threshold limit of absorption of toxic substances is exceeded. The three gases causing the most damage to vegetation are carbon monoxide, the sulfur oxides, and those containing fluorine. Also to be considered are acid 'smog', toxic 'smog', ozone, and nitrogen oxides. Other industrial pollutants which have a toxic influence, but less sever and localized, are dusts, hydrogen sulfides, hydrochloric acid, etc. Ethylene and carbon monoxide cause great damage to the growth hormones, particularly auxin. The effects of SO2, SO3, and H2S04 are related to the quanity of gas emitted, the degree of resistance of the species, their state of development, and the various environmental conditions. The sensitivity of vegetation to the action of sulfur gases varies essentially as a function of the speed of absorption of the gas by the leaves. Through experimentation it has been found that the plant species which are most sensitive to SO2 are chickweed, alfalfa, barley, oats, wheat, rhubarb, lettuce, endive, spinich, cabbage, and tobacco. Apples, apricots, peaches, grapes, corn, and beans are less sensitive, whereas the floral species such as gladiolus, rose, and lilac offer considerable resistance. Aquatic vegetation is often used as purifying means for polluted streams. Subsoils purify themselves of pollutant materials in various ways, including uptake by vegetation and dispersion in the soil with rain water, etc. In a section on means of decreasing the inhaled pollutants the following are mentioned: dust collectors, normal methods of dispersion in the atmosphere, fumes from domestic fires, auto exhaust fumes, fuel additives, improvement of combustion in engines, recycling of crankcase gases, post-combustion appliances, and redesigning of motors. Also given in this section (Chapter 3) is some similar information on ingested pollutants and on problems of noise.

04368

H. Schnitt and E. Moser

FURTHER DEVELOPMENTS OF THE FLUORINE PROBLEM IN THE ALUMINUM INDUSTRY. Weitere Entwicklungen zum Fluorproblem in der Aluminium-Industrie. Z. Erzbergbau Metallhuettenwesen 18, (3) 111-5, Mar. 1965. Ger.

This paper reports on the state of the arts concerning control and scrubbing equipment for fluoride inside working premises as well as directly from electrolytic furnaces. Far reaching research has improved the already very effective methods and installations. An optimal aerodynamic air ventilation is used very effectively. Control of dust and gaseous components, measurements of fluorine from the air inside of working premises and from the exhaust are done separately. Measurement and control is accomplished according to VDI-Richtlinien (guides) No. 2093 and 2452. The success of reduction in fluorine content with the installation of control equipment can be measured by the reduction of the fluoride content in grass, in the vicinity of the plant, which is used as cattle feed.

07360

Domros, M.

LICHENS AS INDICATORS OF AIR POLLUTION AND CITY CLIMATE. ((Flechten als Indikator von Luftverunreinigung und Stadt- klima.)) Text in German. Stadtehygiene (Uelzen/Hamburg), 18(2):33-39, Feb. 1967. ((42)) refs.

In the Ruhr valley, a study of the distribution of lichens was performed with the aim of answering the question whether lichens are useful indicator plants for air pollution. In urban areas, 25,000 trees were surveyed and their coverage by epiphytic lichens evaluated. Three zones were distinquished: lichen deserts, coinciding with industrial areas, a zone of struggle, and zones populated by lichens. It could not be safely established whether air pollution alone is influencing the distribution of lichens. Rather, a combination of air pollution and city climate with its lower humidity and higher temperatures is more likely responsible. Experiments are suggested to determine detailed environmental factors influencing the growth of lichens. Four maps and six tables illustrate climate, air pollution, and lichen distribution in the Ruhr valley.

11415T

R. Zahn

EFFECTS OF SULFUR DIOXIDE ON VEGETATION: RESULTS OF GAS EXPOSURE EXPERIMENTS. (Wirkungen von Schwefeldioxyd auf die Vegetation. Ergebnisse aus Begasungsversuchen.) Translated from German. Staub, (English translation) 21(2):56-60, Feb. 1, 1961. 7 refs.

The resistance of different plants to exposure with sulfur dioxide in concentrations varying from 0.15 to 0.8 was studied. Long range tolerance limits were determined in a range from 0.15 to 0.4 ppm for different plants. Also the effects of short duration exposures, the importance of time intervals between exposures, the effects of duration of exposure and concentration, and the combination of toxic and subtoxic concentrations were determined. For a given amount of gas an increase of non-exposure period and an increase in impulse frequency of gas exposure were found to prolong the threshold period after which irritation occurs. Concentrations below the threshold value were found to enhance the effect of concentration peaks. In all cases a strict distinction had to be made between continuous and intermittent exposure, the latter allowing recuperative pauses within certain ranges of concentration. The plants were divided into the following groups according to their resistance as well as their tolerance: 4) clover type cattle feed, 2) cereals, and 3) rape, cabbage etc. Individual SO2 immissions cannot be treated by a simple additive process in the determination of gas effects on plants. The manner of their distribution over the diurnal period must be taken into account, along with biological and meteorological factors.

12489

Ishizuka, Yoshihisa, Shogo Ochiai, Yoshio Saiki, Nobuaki Kadoya, Yoko Nishikawa, Takashi Yokoyama, Yoshihiro Matsuoka, Harumi Koyasu, Osamu Undagawa, Hideo Ishiwata, Toshio Ohno, and Michio Maeno

EFFECTS OF AIR POLLUTANTS (2). Taiki Osen Kenkyu (J. Japan Soc. Air Pollution, 2(1):78-80, 1967. Translated from Japanese. 12p.

Studies on the relationship between air pollution and the sulfur content of tree leaves, the effect of sulfur dioxide on the germination of pear pollen grains, and the effects of pollutants on trees are summarized. The sulfur content of tree leaves, as determined by the barium sulfate gravimetric method, was positively correlated with atmospheric sulfur oxide concentrations measured by the lead dioxide method. The effects of sulfur dioxide on the germination of pollen grains were relatively minor. Correlations were observed between the degree of air pollution and the growth, sturdiness, and autumnal tints of trees. In the case of ginko and platanus trees, there was an intimate correlation between sturdiness and leaf color and the amounts of dust and S03 on the leaves. However, the damage appeared to occur by a different mechanism in each species.

12534

Iagovkin, A. F.

HYGIENIC CONDITIONS IN THE OPEN-HOUSING SYSTEM OF CATTLE RAISING. ((Gigienicheskie usloviya stoilovolagernogo soderzhaniyz korov.)) Text in Russian. Nauchnoproizvodstvennaya informatsiya, 7:109-111, 1954.

Open-housing raising of cattle was investigated at 7 farms. Effects of environmental conditions (temperature, moisture content and purity of air) on the physiological state and productivity of cattle raised under various conditions (tents, camp sheds, winter barnyards) were studied. Evaluations were made in terms of physiological indices: pulse frequency, breathing, heat release and day and night milk yield. An investigation was made of pulmonary gas exchange with the aid of respiratory masks. The corresponding data, relating temperature, number of respiration and heat release, are tabulated and an optimum 24-hour time schedule is proposed, based on 8-hour periods between milking and presumed night pasturing. The average annual milk yield of cattle under examination amounted to 4,000 to 5,000 liters under 40 to 50 per cent open-housing conditions. Summer camps necessitate the erection of adequate enclosures, because on cold or rainy days, or at night, the keeping of cattle in the open air decreases their milk yield. Winter barnyards may be also used, if necessary, on hot or cold days to provide cattle with rest. The barnyards then have to be constantly ventilated to prevent a detrimental rise in temperature, and moisture and ammonia content of air.

12535

Kruger, Gerhard

AN INCIDENT OF DERMOPLAKIA PARALYTICA ALBICANS AFTER TREATMENT OF MANGE WITH GAS. ((Ein Fall von Dermoplkia paralytica albicans im Anschluss an Raudebegasung.)) Text in German. Berlin Muenchn. Tieraerztl. Wochschr., 8:156-157, 1951.

Through the treatment of mange with gas the skin is sometimes injured. This is caused by a reaction of sulphur dioxide with the moist skin (SO2 + H2O = H2SO3). In the spring of 1946 a fifteen year old mare was treated with SO2 against mange. About eight weeks later an eczema developed which was treated with some sort of cream. The eczema healed within six weeks. Four months after the treatment with gas, spots of white hair of the size of a coin were observed which enlarged rapidly and after 30 months the entire area from the knee upward was affected. About 32 months later the farmer observed some difference in the movement of the right leg as compared to the left, 36 months later frequent stumbling. After another six months the horse fell when it wanted to turn and it could not lie down any more but rested using the wall of its stable as support. In the 46th month the farmer had to slaughter his horse. Two X-rays and an illustration of the spread of the disease are given.

13624

Stoeckl, W. and M. Weiser

COPPER MANGANESE ZINC AND MAGNESIUM CONTENT IN ENDOCRINE ORGANS OF HORSES, CATTLE AND PIGS. (Kupfer-, Mangan-, Zink-und Magnesiumgehalt in endorkrinen Organen beim Pferd, Rind und Schwein.) Translated from German. Zbl. Veterinaermed, 15(2):477-479, July 1968.

In horses, cattle and pigs the content of copper, manganese, zinc and magnesium was determined in the pituitary, adrenal, thyroid, pancreas, ovary and thymus, and the mean values and standard deviations were determined. Within the same animal there were considerable variations of each element as between the different endocrine glands and similar significant differences from one animal to another. These results are not extensive enough to permit any conclusion on the relationship of the examined elements to the endocrine function or their influence on the enzyme activity.

13838

Macuch, P., E. Hluchan, J. Mayer, and E. Able

AIR POLLUTION BY FLUORIDE COMPOUNDS NEAR AN ALUMINUM FACTORY. Fluoride Quarterly, J. Intern. Soc. Fluoride Res., 2(1):28-32, Jan. 1969.

From 1958 to 1965, contamination near an aluminum factory in the vicinity of Bratislava, Czechoslovakia, averaged 0.14 mg F/cu cm. This average represents a fivefold increase above the maximum allowable concentration of 0.03 mg F/cu cm. The gaseous fluorides HF and SiF4 constitute 39% of the fluid values in the air near the plant as compared to 61% solids, namely CaF2, NaF, and AlF3. The proportion varies with the distance from the factory: at an area 8 to 9 km from the factory, 15% solid and 85% gaseous F compounds were present in the atmosphere. The relative increase in gaseous compounds is apparently due to sedimentation of the solid F compounds near the factory. Values of the yearly F fallout in the contaminated area were 44 to 7337 kg sq km. F values obtained for soil in the area of the factory were 135 mg/100 g (1350). This is 4 to 7 times higher than the usual F content of soil. Grass near the factory contained F values as high as 133 mg/100 g dry substances. While running surface waters showed only slightly increased F levels, standing surface waters contained as much as 10.9 mg/1. Determination of F fallout and of F content in plants and biological materials is the best means of assessing long term effects of fluoride emissions. Meteorological influences appear to be less significant in evaluating F damage. The composition of soil, the presence of F dust on plants, and the F content of flowing and ground waters are of little use in determining F damage to human, plant, and animal life.

14417

Boertitz, Siegfried and Michael Vogl

PHYSIOLOGICAL AND BIOCHEMICAL CONTRIBUTIONS TO SMOKE DAMAGE RESEARCH. 9. PHYSIOLOGICAL INVESTIGATIONS OF RESISTANCE DIFFERENCES OF PINUS SILVESTRIS. (Physiologische und biochemische Beitraege zur Rauchschadenforschung. 9. Physiologische Untersuchungen zur individuellen Rauchhaerte von Pinus silvestris). Text in German. Arch. Forstw., 18(1):55-60, 1969.

To separate the effects of prior exposure to sulfur dioxide and of higher sensitivity to SO2 in evaluating results of SO2 exposure tests, measurements of intensity of assimilation and transpiration and of smoke resistance of plants should be carried out independently on specimens grown in smoke-free environments. Accordingly, twigs cut from 16 clones of 12-year old pine tree grafts were subjected to shock-gassing by a previously described method and ranked according to their smoke resistance. The most and the least resistant clones were selected for subsequent tests in (1) SO2-free air and (2) air containing 0.4, 1.5, or 3.0 ppm of SO2. In (1), May shoots cut from either kind of clone were trimmed under water and kept standing in water for two or three days, after which their gas exchange was measured in the laboratory with coupled infrared absorption spectrographs. In (2), individual intact twigs of either kind of clone were gassed with SO2-containing air in situ, and their CO2 assimilation was measured by a previously described method. In (1), the net assimilation intensity of either kind of clone showed no significant differences, that of less resistant clones tending to be higher while exhibiting wider individual variations. In (2), the depression of net assimilation due to shock-gassing sets in sooner in the less resistant clones; also, at higher SO2 content, the depression is more intense and the recovery is slower than in the more resistant clones.

14433

Lampadius, Felix

THE BURKHARDTSWALD FOREST NEAR AUE AS A CLASSICAL EXAMPLE OF SMOKE INJURY PROTECTION. (Der Burkhardtswald bei Aue als klassisches Beispiel waldbaulicher Rauchschadenabwehr). Text in German. Abhand. Saechs. Akad. Wiss. Leipzig, Math.- Naturw. Kl., 20p., 1969. 44 refs.

A history of smoke injuries in the past 80 years in the Burkhardtswald forest near Aue, East Germany, is given, along with an evaluation of the protective measures which have been taken. The prevailing species in the Burkhardtswald is the spruce, although the climatic conditions are not the best for its growth. It is an area of moderate precipitation, almost not sufficient for coniferous trees. The entire forest is subjected to average SO2 emissions of 0.20 mg/cu m, mainly stemming from combustion of coal. For the past 30 years extensive arsenic emissions have also affected the area. Their contribution to smoke injuries of trees has not yet been studied. Smoke injuries from SO2 on spruces and firs were observed in the forest as early as 1860; older trees were particularly affected. For the past several decades, dead or severly injured spruces and firs have been replaced by fast- growing Weymouth firs, red oaks, and birches. Unfortunately, no plan was established, so that in some areas, less valuable birch groves developed. Cultivation of Pinus nigra in this area is still in the experimental stage. In the future, Japanese firs will also be planted. On the average, it was found that beech trees are growing very well in the area, and no smoke injuries have been observed on them.

14489

Kobayashi, J., F. Morii, S. Muramoto, and S. Nakashima

EFFECTS OF AIR AND WATER POLLUTION BY HEAVY METALS (CD PB AND ZN) ON AGRICULTURAL PRODUCTS CAUSED FROM A MINE REFINERY IN GUMMA PREFECTURE. (Gumma-ken ka no bo kozan seiren go no hai gas niyoru nosaku motsu nado no gukinzoku osen (Cd, Pb, Zn) ni tsuite). Text in Japanese. Nippon Eiseigaku Zasshi (Japan J. Hyg.), 24(1):67, April 1969.

Pollution of plants growing on a hill by cadmium, zinc, and lead present in waste gases from a mine refinery was determined by atomic absorption spectrophotometric analysis of the elements following their extraction from dried and ashed plant samples. Plant distance from the refinery ranged from 400 to 2500 m, and plant content of metals varied with distance. Cadmium levels ranged from 17 to 3.3 ppm and zinc from 2590 to 360 ppm in mulberry leaves. The cadmium content of moss, greens, and eggplant leaves collected at 700 m from the refinery varied from 41 to 61 ppm and the zinc content from 2620 to 7010 ppm. Values were lower in corn, tomatoes, pumpkins, and persimmons. Taro, carrots, Welsh onions and burdochs showed medium values.

15158

Taniyama, Tetsuro and Hiroki Arikado

STUDIES ON THE MECHANISM OF INJURIOUS EFFECTS OF TOXIC GASES ON CROP PLANTS. III. ON THE DEGREE OF INJURIES AND A KIND OF TYPICAL SYMPTOM OF INJURIES CAUSED BY H2SO3 SOLUTION SPRAY TO RICE PLANTS. (Sakubutsu no gasu shogai ni kansuru kenkyu. Dai 3 ho. Aryusansui no yomensanpu ni yoru suina no shogai to shogai teido ni tsuite). Text in Japanese. Nippon Sakumotsu Gakkai Kiji (Proc. Crop Sci. Soc. Japan), 38(2):222-228, June 1969. 15 refs.

Two kinds of symptoms typical of injuries caused by sulfur dioxide as H2SO3 were observed on the leaf blades and sheaths of paddy rice; one was multiple brown spots and the other was white lesions. These symptoms were observed at the leaf tip, between the veins, and sometimes at the edges of the blades and sheath. To prove that these symptoms were actually due to SO2, rice plants were sprayed with H2SO3 solution both during the day and at night. Only brown spots were observed; decrease in chlorophyll was directly proportional to the amount of acid sprayed, and the most severe damage was inflicted on the leaves in the third and fourth position from the top. Sulfur content was higher in leaves sprayed during the day than in those sprayed at night.

15228

Materna, J., J. Jirgle, and J. Kucera

RESULTS OF THE MEASUREMENT OF SULPHUR DIOXIDE CONCENTRATIONS IN THE WOODS OF ORE MOUNTAINS. (Vysledky mereni koncentraci kyslicniku siriciteho v lesich Krusnych hor). Text in Czech. Ochrana Ovzdusi, 1(6):84-92, 1969. 5 refs.

The concentration of sulfur dioxide was measured on different days to compare the level of emissions with the state of the woods and to observe the changes in concentration levels as a result of new emission sources. Emissions considered were SO2 levels above 0.01 mg/cu m. Measurements were taken with polarographic - coulometric analyzers beginning in 1966 in five regions which ranged from undamaged to heavily damaged fir copses. Measurements were taken at 30 minute intervals for one year. During measurement, the influence of emissions from a new thermal plant was seen on undamaged copses as the conditions grew worse. The results proved that there is a relationship between the damage of the copse and the emission level. It was verified that fir copses are damaged by lower sulfur dioxide concentrations than expected. To express all the factors that are influential in damaging plants, measurements based on an analysis of air samples abstracted during a longer time period are necessary.

15538

Guderian, R.

REACTIONS OF PLANT COMMUNITIES IN THE FIELD CULTIVATION OF FODDER TO SO2. (Reaktionen von Pflanzengemeinschaften des Feldfutterbaues auf Schwefeldioxideinwirkungen). Text in German. Schriftenreihe Landesanstalt Immissions-und Bodennutzungsschutz Landes Nordrhein-Westfalen (Essen), no. 4:80-100, 1967. 7 refs.

Sulfur dioxide exposure experiments were performed in small plastic greenhouses where various types of fodder plants (clover, grass, rye, etc.) were grown either in pots or in the soil. Various SO2 concentrations and exposure times were selected. In the first experiment, clover (Trifolium pratense) and grass (Lolium multiflorum) were exposed for 9 hours to SO2 concentrations of 1 mg, 2 mg, and 5 mg/cu m air. While 1 mg SO2 had no effect on the plants, 2 mg clearly retarded growth of the clover. The grass showed a reduced growth rate only at 5 mg, whereas the clover growth rate was already down to 37% that of the control. This selective effect of SO2 could be confirmed by other experiments with Vicia villosa Roth, Trifolium incarnatum L., and Lolium multiflorum. The first two plants experienced extremely retarded growth, while the last grew satisfactorily. The shift in the composition of plant communities becomes more pronounced at higher SO2 concentrations. Resistance of the plants to air pollutants varies with their developmental stage. Exposure to SO2 of Vicia villosa Roth. and Avena sativa L., which were both in an early developmental stage, showed that the latter was damaged much more in the eight-leaf stage than in the 3-leaf stage. The Vicia villosa growth rate was greatly reduced, while oats produced more chlorophyll. A study of the yield of clover and Lolium multiflorum grown together and separately showed that the former had a lower yield in both cases, and the latter had a higher growth rate in the mixed bed than when grown alone.

16059

Rozybakiev, M. A. and M. M. Ababkov

EFFECT OF CO, CU AND MN ON THE CONTENT OF TRACE AND OTHER ELEMENTS IN THE SALIVA OF SHEEP. (Vliyanie Co, Cu i Mn na soderzhanie mikroi makroelementov v slyune ovets). Tr. Inst. Fiziol. Akad. Nauk Kaz. SSR, vol. 10:101-105, 1966. 10 refs. Translated from Russian. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 10p., Sept. 25, 1969.

Trace elements are necessary for the normal course of biological processes. Cobalt affects tissue metabolism, depressing oxidative processes, and non-specifically activating enzymatic metabolism. Copper is a necessary constituent of all cells. Manganese acts on the reproductive capacity of animals and is required for growth. The physiological action of copper, cobalt, and manganese on the content of trace elements and more abundant elements in the secretion of the parotid glands in sheep was investigated. The experiments were performed in series. In the first series, the separate effect of each element was studied. In the second series, complex supplementation with Cu + Mn + Co was carried out. The elements found in saliva were Na, K, Ca, Si, Mg, Al, P, Cu, Mn, and Ti. The content of Na, K, and Si in the saliva in all series did not change. Introduction of Co increased Ca and Cu content and decreased P, and had no effect on Mn. After Co supplementation was stopped, the content of Ca, P, and Cu in the saliva increased slightly. The addition of Cu increased Mg and Cu content. After Cu feeding was stopped, Cu and P decreased and dropped to the original level. The addition of manganese to the diet has no effect. Combined feeding has no effect on P, Ca, and Mn content of the saliva, but the amount of Cu increased, even after supplementation stopped. Cobalt was not found in the saliva in any of the cases.

16152

Garber, Kurt

A STUDY OF THE INTAKE OF TOXICANTS THROUGH THE BARK OF TREES. (Ueber die Aufnahme von Schadstoffen durch die Rinde der Baeume). Text in German. Wiss. Z. Tech. Univ. Dresden, 11(3):549-552, 1962. 12 refs.

The retention of fluorine and its compounds in the bark of trees is discussed. Analysis of the barks of willows, poplars and alders stemming from the vicinity of a superphosphate plant showed considerable amounts of fluorine; hardly any traces were found in the wood. The quantitative analysis of fluorine by perchloric acid distillation showed that a relationship exists between the fluorine content in the bark and the distance of the emission source. Gassing experiments with hydrofluoric acid on three-year old barren trees and cut branches in the winter showed that the fluorine content rose to between 33 and 65 mg in 100 g dry substance, depending on the exposure time; 1.71 to 4.28 mg fluorine was found in the wood. In non-exposed trees, fluorine concentrations of 0.9 to 1.6 mg in the bark and 0.2 to 0.3 mg in the wood were found. A further series of gassing experiments with trees during the winter period showed that the fluorine content of the leaves was twice or three times as high as that of non-exposed trees. Maple leaves from trees whose bark was treated with a 2% sodium fluoride solution also showed an increased fluorine concentration. Trees in the vicinity of a tar and asphalt plant stored higher concentrations of tar containing substances in the bark and, to a less extent, in the wood. Barren trees in the winter were exposed to ammonia. NH_3 could be found in the bark; it was not found in the wood.

16222

Guderian Robert, Hans Van Haut and Heinrich Stratmann

EXPERIMENTAL STUDIES OF PHYTOTOXIC HYDROGEN FLUORIDE CONCENTRATIONS. (Experimentelle Untersuchnungen ueber pflanzenschaedigende Fluorwasserstoff-Konzentrationen). Text in German. Forschungsber. Landes Nordrhein-Westfalen, no. 2017:54p., 1969. 48 refs.

The resistance of important plant cultures to hydrogen fluoride and the HF concentrations which cause plant injuries at long-term exposure were determined. The test plants were exposed to certain HF concentrations in small plastic greenhouses. Studies of the resistance of certain agricultural and forest plants lead to the formation of various resistance groups which are important for diagnosis as well as for the selection of plants for cultivation in HF polluted areas. For diagnosing purposes, the resistance groups were established with respect to leaf resistance; the yield was used as a criteria for establishing resistance groups in the planning of plant cultures. Tuberous plants e.g., tulips, crocusses, narcissas, etc., are not suitable for cultivation in HF polluted areas. Peas, beans and lupines showed a higher yield reduction than oats, corn, and summer rap. HF pollution might lead to drastic changes, such as reduction of less resistant plants which in turn enhances the growth of resistant species. Concentrations of 1 to 2 microgram HF/cu m caused severe injuries in tuberous plants after several days of exposure. In grasses and various types of clovers, a fluorine accumulation of 9 mg/100 g dry substance was found at a 16 day exposure to an average concentration of as little as 0.85 microgram HF/cu m. Winter barley showed a yield reduction after 12 days of exposure to 3.3 microgram HF/cu m. Oats, lupines, and peas showed a growth retardation at concentrations above 4 microgram HF/cu m. Spruces, Weymouth pines, Japanese lark, and Nordmann hemlocks began to show needle injuries after several days of exposure to concentrations between 1.5 and 4 microgram HF/cu m. Older leaves generally showed higher fluorine accumulations than young ones.

16226

Materna, Jan

DETERMINATION AND PREVENTION OF AIR POLLUTION DAMAGE TO FORESTS IN THE CZECH PART OF THE ERZGEBIRGE. (Forstliche Massnahmen zur Erfassung und Verhuetung von Waldrauchschaeden im tschechischen Teil des Erzgebirges). Forst Holzwirtschaft, 15(13): July 1960. 7 refs. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 10p., Oct. 13, 1969.

Spruce trees in the forest areas of the Erzgebirge were found to be extensively damaged by sulfur dioxide present in smoke from open coal pits and coal processing plants. Trees located in exposed areas such as ridges and plateau swamps were especially sensitive. Atmospheric sulfur dioxide concentrations of 14.90 mg/cu m were recorded. Soil investigations showed acidification of the humus layer and of the top layer of the mineral soil. Sulfur concentrations in the soil reached up to 384 mg SO_3 per kg soil. Zinc, lead, and chromium were also present in concentrations exceeding critical values. Countermeasures indicate the efficiency of stone meal, primarily basalt meal, in promoting tree resistance to sulfur dioxide and of calcium and nitrogen fertilizers in improving the quality of the humus soil layer. Since the silicic acid concentrations are always high in the needles of injured spruces, it is thought that this compound might be a useful indicator of plant damage.

16632

Efler, J.

EFFECT OF INDUSTRIAL EMISSIONS ON GROWING SPRUCE STANDS IN RELATION TO DIFFERENT TYPOLOGICAL UNITS. (Vliv prumyslovych exhalatu na dospivajici smrkovy porost se zretelem na rozdilne typologicke jednotky). Scientific and Technical Society, Prague (Czechoslovakia), Agriculture and Forestry Section, Proc. Conf. Effect Ind. Emissions Forestry, Janske Lazne, Czechoslovakia, 1966, p. IX-1 to IX-24. (Oct. 11-14.) Translated from Czech. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, April 24, 1969.

The problem of smoke damage in a fellable spruce stand with respect to various typological units is discussed. The investigation was carried out in the forest of Vysoky Sneznik which belongs to the sandstone region of Bohemian Switzerland. In the localities containing the individual types, basic rating data, health conditions and quality of trees, their height pattern, and size of crowns were studied. From each typologic unit, 40 borings were taken by means of a Pressler borer from 20 centrally located trees. The tree ring analyses of these borings were performed with the Eklund apparatus with a plotting adapter. The soil condition of the individual types were investigated by six soil probes. The age of spruce stands in the long-term research area, ascertained by borings, was 75 years. Injuries to trees due to industrial exhalations, smoke injury, tree mortality, distribution of thickness growth increments in trees with various degrees of smoke injury, and comparison of relative thickness growth increments in individual units were graphed. It was established that smoke injury, mortality of the trees and decrease in growth are much greater on exclusively podzol and gley soils than on ochre soils and moderately podzol soils. It is indicated that the smoke damage does not appear to be uniform in various localities. The investigation raised the need for adapting forest management in smoke damage areas to the particular features of the locality.

16633

Steinhubel

CONTRIBUTION TO THE STUDY OF THE EFFECTS OF NONTOXIC EMISSIONS ON WOODY PLANTS. (Prispevok k studiu ucinkov netoxickych immisii na driviny). Scientific and Technical Society, Prague (Czechoslovakia), Agriculture and Forestry Section, Proc. Conf. Effect Ind. Emissions Forestry, Janske Lazne, Czechoslovakia, 1966, p. XIX-1 to XIX-34. (Oct. 11-14.) Translated from Czech. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, April 24, 1969.

The possibility of whether the decrease in the formation of dry matter could also be caused by deterioration of the balance between 'formation of dry matter and destruction' is reported. A known photosynthesis has its optimum at temperatures lower than those of dissimilation and thus, at super-optimum temperatures, a decrease in the efficiency of photosynthesis can arise. The gross dry matter formation for three various temperatures was determined. Dry matter formation in darkness was checked and the intensity of dissimilation was tested by a manometric method. The gross dry matter growth increment in pure leaves rose with increasing temperatures much more rapidly than that in contaminated leaves, which exhibited decreased dry matter formation. The curve of the relative increase of respiration at equal temperatures indicates that the difference should be ascribed to dissimilation. Investigation of the water supply showed that improvement of situation in dusted leaves (increased release of water, reduced water content) can be expected only under intensive irradiation in laboratory conditions. (Author abstract modified)

16634

Wentzel, K. F.

A PROPOSED DRAFT OF A CLASSIFICATION OF IMMISSION DISEASES. (Navrh klasifikace imisnich onemocneni). Scientific and Technical Society, Prague (Czechoslovakia), Agricultural and Forestry Section, Proc. Conf. Effect Ind. Emissions Forestry, Janske Lazne, Czechoslovakia, 1966, p. 11-1 to 11-9. (Oct. 11-14.) Translated from Czech. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, April 24, 1969.

It is useful to adapt the existing and presently used terminology with respect to plant damage to the advanced knowledge of the art while preserving proven concepts. Designations which can be misunderstood or are unnecessary should be dropped. This is true especially for the terms invisible injury and invisible damage. It was suggested that the concept of injury be replaced with respect to physiologic effects, by disease, because this designation can be understood only in the biological, and not economic, sense. It was further suggested to distinguish between acute and chronic diseases, and also recognize a class of secondary disease, together with two kinds of damage, direct and indirect. In order to differentiate clearly among the concepts involved in the casual chain, fume-damage terminology would thus, in respect to the proposed classification, include 2 forms of effects, 3 grades of disease, and 2 kinds of damage (7 terms in 3 successive influence stages). (Author abstract modified)

16637

Ranft, H.

EVALUATION OF A PREVIOUS PLANTING EXPERIMENT WITHIN THE RANGE OF THE ZINC SMELTER AT FREIBERG. (Vyhodnoceni starsiho pokusu s vysadbou v dosahu zinkove hute u Freibergu). Scientific and Technical Society, Prague (Czechoslovakia), Agriculture and Forestry Section, Proc. Conf. Effect Ind. Emission Forestry, Janske Lazne, Czechoslovakia, 1966, p. XV-1 to XV-15. (Oct. 11-14.) Translated from Czech. Franklin Inst. Research Labs.. Philadelphia, Pa., Science Info. Services, April 24, 1969.

A planting experiment on 10 ha of 40 tree and shrub species which was started i1935 in an area of emission attack from a metallurgical plant at Freidberg in Saxony was evaluated. The experiment was northwest of the plant at 400 m above sea level on a flat plain which slopes eastward to the Mulda valley. The basic stratum is gray gneiss; the soil is medium-to-deep, quite loamy, and exhibits medium sorption and nutrient values. The trees and shrubs were planted in small stands, also in rows and mixed groups, or former agricultural land. The prevailing winds were from southwest to northwest and the growing stands were injured only slightly by the stack gases from the metallurgical plant. After the beginning of the operation of a new zinc refinery which was located a few hundred meters northwest, an increased attack was evidence by SO2, SO3, and iron oxide dust containing waste material. The iron oxide dust did not prove harmful. Short-term measurements gave peak values of more than 1.2 mg SO2/cu m of air. Injuries affecting the size of leaves and fascicles, their color, with necrosis and inhibition of growth of foliage and fascicles was observed. The extent of current damage was determined. Measurements of height and circumference, together with borings, confirmed the more or less large decrease in yields from various representative varieties of woody plant found in the area. Smoke damage on trees and shrubs, based on damage manifestations and yield decrease, were graded and were listed.

16656

Kohout, R. and J. Materna

SORPTION AND PROPAGATION OF SULFUR DIOXIDE IN THE ASSIMILATION ORGANS OF SOME FOREST WOODY PLANTS. (Sorpce a sireni kyslicniku siriciteho v asimilacnich organech nekterych lesnich drevin). Scientific and Technical Society, Prague (Czechoslovakia), Agriculture and Forestry Section, Proc. Conf. Effect Ind. Emissions Forestry, Janske Lazne, Czechoslovakia, 1966, p. XVII-1 to XVII-6. (Oct. 11-14.) Translated from Czech. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, April 24, 1969.

The extent of localization of sulfur dioxide in the vegetation organs of plants was investigated. Experiments showed that sulfur dioxide is not absorbed in a uniform manner across the surface of the individual tested leaved trees. Increased concentrations of SO2, as evidenced in autoradigrams, was observed primarily on the tips of the leaves and along serrated borders, or along the edge of the leaf, mostly in narrow, but sometimes also broad, diffuse zones. The concentration of SO2 in the tips and borders of the leaves increased within a range of 10-100%. The autoradiograms indicated that penetration of radioactive sulfur compounds into the leaf tissue occurred only with Ulmus effusa and Fagus silvatica. It was also established that sulfur dioxide sorption was highest with Betula verrucosa, Fagus silvatica, and Carpinus betulus. Sulfur dioxide sorption decreased somewhat with Ulmus effusa, Salix caprea, and Robinia pseudacacia. Substantially reduced sorption was observed in acer platancides, Sorbus aucuparia, Acer campestre, and Populus nigra italica. No definite conclusions were drawn about the sorption of sulfur dioxide by the leaves of trees and the migration of sulfur compounds which arose from SO2 within the plant organism. However, it was directly proved that the leaves of many woody plants are really capable of accumulating sulfur dioxide in their marginal portions, even during a very short period, from an environment which contains non-toxic concentrations of the gas.

16657

Enderlein, H., W. Kastner, and H. Heidrich

THE RESPONSE OF SEEDLINGS OF THE LARIX GENUS, TESTED WITH RESPECT TO SMOKE RESISTANCE, IN THE AREA OF EXTREME SMOKE INJURIES, PARTICULARLY UNDER THE EFFECT OF SEVERE FROST, OR LATE FROST. (Zak reaguji sazenice rodu Larix, zkousene na odolnost proti kouri, v extremni oblasti kourovych skod, zvlaste pod vlivem silneho mrazu, pripadne pozdniho mrazu). Scientific and Technical Society, Prague (Czechoslovakia), Agricultural and Forestry Section, Proc. Conf. Effect Ind. Emissions Forestry, Janske Lazne, Czechoslovakia, 1966, p. XVI-1 to XVI-11. 6 refs. (Oct. 11-14.) Translated from Czech. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, April 24, 1969. The behavior of seedlings with known resistance to sulfur dioxide was tested by experimental plantings in natural emission areas. In previous experiments, the greater or lesser resistance of larches to smoke was determined genetically. It seemed possible that the production of larches of high smoke resistance, by means of controlled cross-breeding, would be promising. The planting of 468 three-year larches was carried out in an area of extreme smoke injury. The site of the planting was almost flat and the soil was formed from podzoled loose brown soil. Considerable damage was caused by winter frosts and also by severe late frosts. All plants were exposed at the same time and for the same duration to a constant concentration of 0.73 ppm sulfur dioxide. Resistance to smoke is conditioned genetically and is hereditary. Results also showed that the highest rate of injury to seedlings was evidenced in the class of plants with greatest sensitivity to smoke, while frost injuries were definitely distributed over all of them. The hybrids originated by cross-breeding in the presence of L. leptolepis grew more than pure crossings of L. decidua. They were also less sensitive to smoke. It was concluded that growth losses in the areas of heavy emissions can be substantially reduced, both by improving the experimental varieties resistant to smoke and by large-scale selection of the most resistant units.

17449

Spierings, F.

INFLUENCE OF AIR POLLUTION ON CROP PLANTS IN SOME INDUSTRIAL AREAS IN THE NETHERLANDS. (Invloed van luchtverontreiniging op land- e tuinbouwgewassen in de nabijheid van enkele industriecentra in Nederland). Text in Dutch. Inst. of Phytopathological Research, Wageningen (Nederlands), Rept. 217, 58p., 1957 (?). 8 refs.

Prompted by serious damage to plant bulbs caused by air pollution in an area northwest of Amsterdam, the Institute of Phytopathological Research conducted a study in that area and two other relatively large areas: west of Rotterdam and east of Sluiskil (Zeeland, near the Belgian border). A field investigation was first made, using specially controlled flower beds of gladiolus and alfalfa, which are particularly sensitive to hydrogen fluoride and sulfur dioxide, respectively, these two industrial gases being considered the most dangerous to plant growth. Distribution of the intensity of damage on the experimental plots indicated the direction taken by the noxious gases, their manner of propagation, and the extent of damage caused. Damaged leaves were then analyzed chemically for fluorine or sulfur content. Commercial crops were compared with those experimentally grown, and crops from areas known to be free of pollution were compared with those from the affected areas. Plants were also 'fumigated' at the Wageningen laboratory, under simulated practical conditions. Comparisons were made of varieties of the two kinds of plants that were known to be either sensitive or insensitive to the industrial gases. The freesia plant, which suffered extensive damage in Dutch greenhouses during autum 1956, was also tested in the gas chambers. Two varieties of tulips were tested: Blue Parrot, which is sensitive to gases, and Preludium, which is not. Other plants tested were barley, broad beans, kidney beans, corn, lettuce, buckwheat, sugar beets, tomatoes, loosestrife, and knotgrass.

17622

Pollanschutz, J.

DIFFERENT GROWTH PATTERNS IN CONIFER TREES UNDER THE SIMULTANEOUS ACTION OF SO2 AND MAGNESITE DUST. (Rosdilny prubeh prirustu u jehlicnatych a listnatych drevin za soucasneho pusobeni imisi SO2 a magne[illegible] prachu). Scientific and Technical Society, Prague (Czechoslovakia), Agriculture and Foresty Section, Proc. Conf. Effect Ind. Emissions Forestry, Janske Lazne, Czecholovakia, 1966, p. VIII-1 to VIII-8. (Oct. 11-14.) Translated from Czech. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, April 24, 1969.

Detailed observations were made from 1959 to 1964 of the injuries to conifers caused by emissions of sulfur dioxide and magnesite dust from a magnesite plant that began operations in 1959. The trees were examined for coloring of fascicles, reduction in the age of fascicles, and decay. Borings were obtained of specimen trees; in characteristic areas, trees were cut for analysis. The results of the investigations showed a chronic development of injuries due to sulfur dioxide, accompanied by annual declines in the growth increments of individual conifers. In the area of intensive emission attacks, the reduced growth had caused the decay of individual trees and groups of trees. Magnesite dust appeared to have little effect on the growth pattern of the trees, though it created shells on many fascicles resembling concrete. The investigations are compared to those of beech trees similarly exposed but which exhibited increases in growth increments. It is hypothesized that the growth was the result of the ability of magnesium sulfate to act as a leaf fertilizer in trees relatively resistant to sulfur dioxide.

17822

Garber, K.

THE INFLUENCE OF FLUORINE CONTAINING EMISSIONS ON PLANTS. (Die Beeinflussung der Pflanzenwelt durch fluorhaltige Immissionen). Text in German. Angew. Botan., vol. 40:12-21, 1966. 18 refs. (Presented at the Botanikertagung, Bonn, Sept. 10, 1965.)

Typical symptoms of plant damage by fluorides are mottling of the leaves, bleaching of the leaf margin and tips, and necrosis and rolling of the leaves. The symptoms alone are sometimes not enough to make a correct diagnosis. It is necessary to determine the F-content of the plant. Several methods are available, such as distillation of the ashed substances with perchloric acid or sulfuric acid and subsequent determination of the F-content of the distillate by colorimetry or titrimetry. The natural F-content of plants must be known. It usually lies between 0.05 and 2.5 mg per 100 g dry substance. A table listing the natural F-concentrations of various types of plants is given. Tree barks can be used for the analyses if leaf samples are not available. A clear difference exists of F-concentration between the bark facing the F-source and the bark facing the opposite direction. To diagnose injuries, plants can be exposed in the pots in the polluted area under equal conditions. In one instance, the injuries were traced to sulfur dioxide rather than F-containing emissions. This shows that a higher F-content in the plant than is natural does not always mean that the visible injuries are a consequence of the higher F-content. Soluble NaF or KF dust on plants may reduce the chlorophyll content of plants. The sensitivity of the plants to fluorides varies and is influenced by the site, nutrition, and the climate.

18229

Gatin, C. L.

METHODS USED FOR THE PREVENTION OF WEAR AND TEAR AND DUST ON HIGHWAYS AND THEIR EFFECT ON VEGETATION. (Die gegen die Abnutzung und den Staub der Strassen angewendeten Verfahren und ihre Wirkung auf die Vegetation.) Translated from German. Zeitschrift fuer Pflanzenkrankheiten (Pflanzenpathologie) und Pflanzenschutz, p. 193-204, 1912. 19 refs.

The effects upon vegetation of tar and petroleum products used to harden dirt road surfaces were studied. Previous laboratory work had showed various tree leaves, grains, vegetable crops, and flowers to be adversely affected by coal tar and its components, ammonia and organic chemicals such as pyridene. Either direct exposure to vapors in a bell jar or sprinkling with empregnated dust gave brown or black discolorations accompanied by attacks on cells, photoplasm, or chlorophyll. To determine the effects of tar under actual road conditions, several streets in the District of Seine, France, were studied. Most trees lining tarred streets showed harmful effects within a period of two years. Displaying a stunted, crippled appearance and producing poorer young shoots, they had a significantly higher death rate than did specimens near non-tarred road surfaces. Leaves were smaller and fell off earlier In addition, trees exposed to tar stored less starch than others and showed abnormal or premature cork proliferations on branches. Decorative plants and flowers adjacent to paved streets all died or suffered severe damage. Ensuing laboratory studies on elm, walnut, sycamore, and maple trees as well as rose and lilac bushes showed harmful action to be due to the deposition of tar-empregnate dust on leaves and shoots. Sunlight was found to increase the damage. The deleterious effects formed in the French study were not reported in England and Germany. Because of the long period sometimes necessary for the effects to appear, this did not preclude their existance in these countries. It was recommended that precautionary measures used in the United States be followed. There, harmful components of tar were removed before application, and tar-macadam and bituminous earth surfaces were used.

18230

Bredemann, G., and H. Radeloff

PERTAINING TO THE DIAGNOSIS OF DAMAGE INDUCED BY FLUORINE-FUMES. (Zur Diagnose von Fluor-Rauchschaden.) Translated from German. Phytopathol. Z., 5(2):195-206, (1932). 15 refs.

An analytical method of analysis to verify fluorine (F) damage to plants is needed because F action shows neither unique nor consistent symptoms. Fluorine compounds attack fruits or enter plants through leaf stomates and decompose into hydrofluoric acid, which then acts on the mesophyll or spongy parenchyma. Several microchemical methods are used for F determination, two of which are particularly suitable for qualitative detection in plants. In the color method of Feigl and Krumholz, F is indirectly identified by the analysis of a process distillate for volatile silicon fluoride. Here, silicon is identified by an analytical method imparting a blue color to the solution. The second method crystallizes F as Na_2SiF_6. Both techniques are shown to be sensitive to small amounts of F, 0.005 mg and 0.05 mg per 100g of dry leaves, respectively, but the latter is simpler and more direct. Experiments with various plants show that in nearly every case neither method gives deceptive, false positive results from naturally present F. It appears possible, however, to get negative results for F presence from plants previously damaged by F in earlier stages of development and from fruits damaged by extremely small amounts of F. Experiments also show that plants exposed to soils with unusually large amounts of apatite or phosphate fertilizer containing fluorides do not pick up detectable amounts of A and show no F damage. Seed germination is inhibited when the concentration of a soluble fluoride (e.g. NaF) is between 0.1 and 0.5 percent. Conveniently, soluble F components from soil can only be detected in the few cases when toxic effects are present. Thus, the simpler Na_2SiF_6 crystallization test is recommended for standard examinations, and the color test for cases where damage from a minute quantity of F is suspected and a negative crystallization test results.

18234

Kralovsky, F., J. Svacha, and J. Paukert

EQUIPMENT FOR THE STUDY OF PHOTOSYNTHESIS IN HIGHER PLANTS. (Zarizeni ke studiu fotosyntezy vyssich.) Translated from Czech. Ochrana Ovzdusi, p. 120-125, 1969. 6 refs.

Equipment has been designed for both the direct method of analysis, which determines the new growth of dry material in isolated sections of leaf tissue, and the indirect, gazometric, method which determines changes in the concentration of carbon dioxide in the atmosphere surrounding the studied object. The apparatus studies the degree to which the photosynthesis of a plant is influenced by the effects of solid industrial emissions by determining changes in the amount of CO_2 taken up by the plant. The equipment provides for measuring amounts of CO_2, conditioning air, determining CO_2 concentration, and carrying out photosynthesis in a controlled chamber. Carbon dioxide concentrations are determined by standard titration. Use has shown the apparatus to be reliable, precise, and flexible.

18264

Oelschlaeger, W., and W. Woehlbier

EFFECTS OF FLUORINE. RESULTS OF INVESTIGATIONS WITH PLANTS AND ANIMALS. (Bestimmung von Fluor in pflanzlichen, tierischen und anorganischen Substanzen, sowie in Waessern und Luft.) Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, Contract No. CPA 22-69-30, Project No. C 2439, 31p., 1968. 41 refs.

In the method for determining fluorine which like most others is based on distillation according to Willard and Winter, all error sources have been eliminated which may exist during sampling, grinding, ashing, treatment of the ash, distillation, and concentration of the distillate. Furthermore, almost F-free calcium oxide has been prepared which must be added prior to ashing to a number of samples of animal origin. For the determination of fluorine, distilling equipment was used which operates automatically to a large extent, is easy to handle, and was developed in cooperation with the aluminum plant Rheinfelden. The apparatus for concentrating distillates with very low fluorine contents works almost automatically. The method was tested with various synthetic solutions as well as with a number of internationally conducted ring analyses over several years. Today the method together with the equipment is used in many laboratories both in this country and abroad for the determination of fluorine in organic, inorganic and other materials.

18265

Garber, K., R. Guderian, and H. Stratmann

INVESTIGATIONS OF THE FLUORINE INTAKE BY PLANTS FROM THE SOIL. (Untersuchungen ueber die Aufnahme von Fluor aus dem Boden durch Pflanzen.) Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, Contract No. CPA 22-69-30, Project No. C 2439, 20p., 1968. 9 refs.

This paper deals with the fluorine intake from the soil, and in particular, answers to the following questions are sought: 1. How great is the fluorine concentration of various types of plants grown in different soils? 2. What effect has a portioned fluorine addition to the soil on the F-concentration of the plant? 3. Are there fluctuations in the fluorine concentration of the plant during its vegetation period? 4. Are there any connections between the F-concentrations of various plant organisms? All investigations were performed in vitro and are based on the experiments on sulfur dioxide effects described by von Guderian (1960). The sites of the investigations are Hamburg, Biersdorf (Sieg) and Kettwig. With the majority of the experiments, the experiments, the computed fluorine concentrations were mixed with the soil prior to sowing. To determine the F-concentration in the experimental soils as well as in the sample plants the method by Oelschlager (1960) was used. The same types of plants show different F-concentrations which moreover do not correlate with the fluorine concentrations of the soils. The fluorine concentration of plants thus is not solely a function of the absolute fluorine concentration of the soil.

18269

Trautwein, K., and Ch. Kopp

EFFECTS OF FLUORINE ON CATTLE UNDER EXPERIMENTAL AND PRACTICAL CONDITIONS. (Fluor-Wirkungen beim Rind [illegible] experimentellen und praktischen Bedingungen.) Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, Contract No. CPA 22-69-30, Project No. C 2439, 31p., 1968. 16 refs.

In the period from 1961 to 1967 fluorosis was experimentally induced in test cattle by feeding them primarily with locally grown, fluorine-containing forage to which sodium fluoride or cryolite had been added. The total fluorine intake by the NaF-fed cows was 1.94 mg F/kg body weight per day, and by cryolite-fed cows 2.48 mg F/kg body weight per day. The fluorine intake thus exceeded the threshold value of about 1.75 mg F/kg body weight per day given in the pertinent literature. Fluorine elimination with the feces was found to be about 0.5 g of F per animal per day with NaF-fed cows and 0.9 g of F per animal per day with cryolite-fed cows. Along with the urine, 0.45 mg of F per animal per day were discharged by NaF-fed cows and 0.3 mg of F per animal per day by cryolite-fed cows. The analysis of tail vertebrae biopsies yielded a fluorine retention of 245 to 890 mg F/100 g ash over the period from 1960 to 1966 for the NaF-fed cows, and of up to 655 mg F/100 g ash for the cryolite-fed cows. The clinical symptoms of fluorosis were slight to moderate yellowish, brownish spots as well as hypoplasia of the incisors, furthermore, weak and temporary functional disturbances of the motility were observed with some cows. The severity of these clinical symptoms were found to be dependent on the degree of fluorine emission. The general physical condition as well as the productivity of the test cows were in most cases satisfactory to excellent. Observations concerning spontaneous fluorosis in the Rheinfelden (Baden) emission area during the past 15 years show that the number and the severity of the disease in six communities had reached a peak in 1958 from whereon a steady decrease of the number of cases is found. This downward trend was parallelled by a decrease of the average fluorine content in the locally grown forage below the tolerance limit.

18270

Woehlbier, W., W. Oelschlaeger, G. Gronbach, and H. Giessler

THE RESORPTION OF FLUORINE BY OXEN FROM SOIL AND FLY DUST OF AN ALUMINUM PLANT. (Die Resorption von Fluor durch Ochsen aus Erde und Flugstaub einer Aluminiumhuette.) Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, Contract No. CPA 22-69-30, Project No. C 2439, 15p., 1968. 8 refs.

The resorption and retention of fluorine contained in three different substances such as NaF, fly dust from an aluminum plant and soil intermingled with fly dust which probably underwent a secondary fluorine reaction. All substances contained a fluorine compound with a relatively high water solubility. The fluorine retention was relatively high with soil, the fluorine excretion in the urine low. The supplementary feeding of the three fluorine-containing substances extending over 316 days brought various high levels of fluorine depositions which agreed with the quantities resorbed.

18271

Cohrs, P., H. Knosel, and Kl. Witte

INVESTIGATIONS ABOUT THE INITIAL STAGES OF THE MORPHOLOGICAL CHANGES OF ORGANS AND TISSUES IN DOMESTIC ANIMALS WITH FLUORINE POISONING. (Untersuchungen ueber die Anfangsstadien der morphologischen Organ- und Gewebsveraenderungen bei Fluorvergiftung der Haustiere.) Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, Contract No. CPA 22-69-30, Project No. C 2439, 10p., 1968. 11 refs.

Experiments are described in which sheep, pregnant sows, and weaned piglets were given fluorine orally in the form of an aqueous solution of sodium fluoride. Histological investigations were made and all organs, especially the endocrine glands, were investigated using usual methods and procedures. The fetuses of pigs and the suckling piglets showed no pathological changes in their developing teeth, in their bones and endocrine glands. Weaned piglets showed varied changes in teeth and bones according to the dose and duration of the application of NaF. Considerable weight reductions were observed in the thymus and adrenal glands of the test animals. No changes were observed in the pregnant sows. Sheep and lambs showed the same changes in teeth and bone tissue as were observed in the weaned piglets.

18272

Trautwein, K., R. Buchner, and Ch. Kopp

LABORATORY AND FIELD INVESTIGATIONS OF FLUORINE EFFECTS OF BEES. (Laboratoriums-und Felduntersuchungen ueber Fluor-Wirkungen bei Bienen.) Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, Contract No. CPA 22-69-30, Project No. C 2439, 10p., 1968. 22 refs.

According to experiments, no damages occurred to bees through dust and powdery substances containing fluorine. The following toxicity of dissolved fluorine compounds was found: a) Sodium fluoride, lethal dose equals 20 micrograms F per bee per 24 hours; 50% lethal dose equals 11 micrograms F per bee per 24 hours. b) Hydrofluoric acid lethal dose equals 10 micrograms F per bee per 24 hours; 50% lethal dose equals 5 micrograms F per bee per 24 hours. There are different sensitivities between the strains of bees and there is a repellent effect of hydrofluoric acid depending on its concentration. In 57 samples of 100 normal bees each, average values between 0.63 to 4.81 micrograms F per bee were found. The bees came from various regions with and without fluorine emissions. In the Rheinfelden emission area, only normal values of 0.6 to 2.8 micrograms F per bee were found in bees which were said to have died from fluorine emissions. Test colonies at a distance of 300 m from the plant showed no disorders after three years. In the Seelze emission region limiting values from 0.9 to 10.6 micrograms F per bee were found in bees which were said to be injured by fluorine emissions. Of two test colonies placed at a distance of 300 m from the plant, one died, the other developed badly during the three years of observation. In the examination of bees which are suspect of fluorine intoxication, other important diseases and aggravating factors must be recognized by differential diagnosis.

18310

Bortitz, Siegrried

PHYSIOLOGICAL AND BIOCHEMICAL CONTRIBUTIONS TO THE RESEARCH OF FLUE-GAS DAMAGE. REPORT 11: ANALYSES OF SOME CONTENTS OF SPRUCE NEEDLES HAVING DIFFERENT INDIVIDUAL FLUE-GAS HARDNESS ORIGINATING FROM A DAMAGE ZONE. (Physiologische und biochemische Beitrage zur Rauchschadenforschung. 11. Mitteilung: Analysen einiger Nadelinhaltsstoffe und Fichten unterschiedlicher individueller Rauchharte aus einem Schadgebiet.) Arch. Fortswes., 18:123-131, 1969. Translated from German.

Spruce needles from a mountainous area were examined after continual subjection to short periods of relatively high levels of atmospheric sulfur dioxide contamination. The metabolism of plants damaged to different degrees by flue gases was investigated to determine reasons for resistance based on internal structure. Paper chromatography was used for carbohydrate analysis and tannin content determined by titration with potassium permanganate. pH analyses were made using methods previously developed for needle analysis. The first sign of SO2 damage is a foster aging of the needles of less resistant trees. Suprisingly, the level of active photosynthesis did not decrease significantly in the damaged needles, but the faster aging process and resulting net loss of needles reduced the total tree activity and material storage. In contrast to needles of resistant trees, those of damaged spruces have a lower water content, a higher sugar level, a lower acidic buffer capacity, and a higher pH in their cell sap. This last finding is unexpected in light of the acidic nature of flue gas. The degree of these effects shows a dependence upon the time of year. Comparisons with other studies shows an apparent influence on the type of SO2 damage of the degree and length of exposure to the pollutant flue gas.

19435

Franke, Wolfgang

ON THE RELATIONSHIPS OF ECTODESMATA TO THE ASSIMILATION OF MATTER THROUGH LEAVES. REPORT I. OBSERVATIONS ON PLANTAGO MAJOR L. (Ueber Beziehungen der Ektodesmen zur Stoffaufnahme durch Blatter. I Mitteilung. Beobachtungen an Plantago major L.) Planta, vol. 55:390-423, 1960. 34 refs. Translated from German. Belov and Associates, Denver, Colo., 51p., Feb. 12, 1970.

The discovery of plasmodasmata in the outer walls of epidermis cells of leaves raised the problem of the physiological significance of the formations now known as ectodesmata. Their localization in the outer walls suggests they could be connections between the protoplasts and the epidermis cells or the entire living plant and the outside world. They could serve as stimulus transmitters or as a means of exchange of material from the surface of the leaf into the cell or in the opposite direction. A series of experiments was initiated to try to establish the function of the ectodesmata. The first results of those experiments are presented and discussed, including the occurrence and distribution of ectodesmata in the leaves of Plantago major, their physiological development in various methods, and relationships to the function of transport paths. Evidence is submitted establishing a probability that the exchange of material between the surface of the leaf and the interior of the tissue takes place through the ectodesmata of the upper epidermis outer walls.

19460

Scheffer, Fritz, Eberhard Przemeck, and Werner Wilms

INVESTIGATIONS PERTAINING TO THE INFLUENCE OF AIRBORNE DUST COMING FROM CEMENT FURNACES ON SOIL AND PLANTS. (Untersuchungen uber de Einfluss von Zementofen-Flugstaub auf Boden und Pflanze.) Staub (Duesseldorf), 21(6):251-254, 1961. 8 refs. Translated from German by Belov and Associates, Denver, Colo.

The effects of cement furnace dusts on plants and soil were investigated. Barley, German weidel grass, sugar beets, and Hungarian red clover were used in the experiments. No damage to the plants was observed over a two-year period. The soil pH increased, and during the second year, when the cement dust had a high potassium content, its lactate soluble K20 content increased with increasing dust quantity. Barley showed a small decrease in yield with increasing dust. For the German weidel grass and Hungarian red clover, the increased alkalinity caused by the dusting process had a favorable effect on the mass yield. Sugar beets also showed an increased mass yield, and the plant contents remained unchanged. The possibility exists of an indirect influence on plant yield and the substances contained in the plants by the soil and by changes in the soil reaction and nutrient. Under certain circumstances this may lead to impairment of plant production. The dust sedimented in the vicinity of cement factories appears to have no immediate danger for plants as long as its influence can be counteracted at the right time. The best counteraction can be achieved by the application of physiologically acid fertilization.

19461

Guderian, Robert

METHODS TO DETERMINE SO2 TOLERANCE LIMITS FOR AGRICULTURAL AND FORESTRY CULTURES IN THE OPEN COUNTRYSIDE EXPERIMENTS IN BIERSDORF (SIEG). Zur Methodik der Ermittlung von SO2 Toleranzgrenzen fur land- und fur stwirtschaftliche Kulturen im Freilandversuch Biersdorf (Sief).) Staub (Duesseldorf), 20(9):334-337, 1960. 12 refs. Translated from German by Belov and Associates, Denver, Colo.

In the area surrounding an iron ore roasting plant, an experiment was conducted in the open countryside to determine tolerance limits for rating sulfur dioxide emissions and assessing their effect on vegetation. Investigations were conducted on the relationship between SO2 content of the air and its damaging effects on agricultural and forestry cultures. Macroscopic and microscopic observations were made to determine acute and chronic damage. Growth and yield observations were also made. Kind and degree of damage were determined; characteristic damage pictures, and the time span between the SO2 effect and the appearance of the first damage are listed. Sulfur dioxide emissions were measured and continually registered by an ultragas-3-instrument. The final values will be given after all the experimental results have been obtained.

19540

Bosener, Rolf

OCCURRENCE OF BARK-BREEDING FOREST PESTS IN FUME-DAMAGED PINE AND SPRUCE-STANDS. (Zum Vorkommen Rindenbrutender Schadinsekten in rauchgeschadigten Kiefern- und Fichtenbestanden). Arch. Forstw., 18(9/10):1021-1026, 1969. 5 refs. Translated from the German. Belov and Associates, Denver, Colo.

Investigations were conducted to determine the extent to which forest plantations, which have already been weakened by industrial waste gases, were exposed to the additional danger of forest pests. The principal emitters in the areas studied were power stations using brown coal, generating large amounts of sulfur dioxide. Determinations of the insects were made at the fall cutting of the trees according to the feed zone characteristics or to the development stages. The frequency of appearance was determined by the number of tree trunks afflicted and by the breeding density of the afflicted trunks. The most significant pest occurring in the pine was Pissodes harcyniae. This pest frequency appears in such a large breeding density per tree truck that the trees die during larva-formation. The frequent occurrence of Xyloterus lineatus is significant, and it should be considered a technical pest. Hylurgops palliatus, Pityogenes chalcographus, Ips typographus, and Dryocoetes hectographus are considered secondary pests. It was determined that the density of bark-breeders is higher in highly-fume-damaged fringes than in areas with less fume damage.

19554

Weigl, Josef and Hubert Ziegler

THE SPECIAL DISTRIBUTION OF 35S AND THE VARIETY OF THE MARKED COMPOUNDS IN SPINACH LEAVES AFTER GASING WITH 35SO2. (Die raumliche Verteilung von S und art der markierten Verbindungen in Spinatblatterr nach Begasung mit SO2). Planta, vol. 58: 435-447, 1962. 21 refs. Translated from German. Belov and Associates, Denver, Colo., 18p., Feb. 17, 1970.

Investigations were conducted on the special distribution of S(35) in spinach leaves after exposure to 50 ppm SO2 (35). For experimentation with radioactive gases, a device was constructed consisting of a Handschvhkammer and a gas chromatograph. This device permitted safe handling of the radioactive gases. An electrophoretic method for separating sulfites, sulfates, and sulfurous amino acids, and N-Ethylmaleinimide compounds with amino acid containing sulfur is given. The SO2 was detected by gas chromatography. The distribution of S(35) in the spinach leaf after exposure to SO2(35) was studied microautoradiographically. After seven hours of exposure, a 2- to 5-fold enrichment of S(35) in the guard cells of the pore openings was observed with respect to the remaining epidermal cells. A portion of the S(35) also entered the vascular paths. The chemical distribution of S(35) was also studied. The result was the rapid installation into cysteine, glutathione, and unknown soluble and insoluble sulfur compounds. The oxidation of sulfite to sulfate also occurred. The results are discussed with respect to the mechanism of the toxicity of SO2. (Author summary modified)

19731

Czech, M. and W. Nothdurft

STUDIES OF THE INJURIES OF CROPS AND VEGETABLES THROUGH CHLORINE, NITROGEN DIOXIDE AND SULFUR DIOXIDE. (Untersuchungen ueber Schaedigungen landwirtschaftlicher und gaertnerischer Kulturpflanzen durch Chlor-Nitrose-und Schwefeldioxydgase). Text in German. Landwirtsch. Forsch., 4(1):1-36, 1952. 2 refs.

Various crops and vegetables were exposed to sulfur dioxide, nitrogen dioxide, and chlorine in the laboratory and in the field. The plants were afterwards exposed to varying degrees of sunlight. Two series of field experiments were conducted: one with dry plants, and one with plants which were sprinkled with water. The plants were exposed to concentrations of 10 ccm, 100 ccm, and 1000 ccm/cu m space for one hour ten times in a row. Winter rape (Brassica napus oleracea) began to show injuries at gasification with 100 ccm/gas cu m. Nitrogen dioxide was slightly less injurious to this plant than SO2 and C12. Winter rye wheat, barley and oat were highly sensitive to the gases and showed injuries already at concentrations of 10 ccm. Sugar beet began to show injuries at concentrations of 30 ccm of the three gases. Sulfur dioxide and C12 attacked the plant more heavily at day exposure and NO2 at night-time exposure. For potatoes, the toxic dose was between 30 and 100 ccm with NO2 and 10 to 30 ccm with C12 and SO2. Alfalfa, lettuce and beans, too, were less sensitive to NO2 than to the other gases. Of the three species, beans were most resistant. Exposure to sunlight increased the effect of the gases on the plants. Sprinkling at the time of exposure was of disadvantage to the plants.

19770

Dieman, et al.

ON THE ACTION OF MERCURY ON VEGETABLE LIFE. (Sur l'action due Mercure sur la vie vegetale). Anal. Chem., vol. 22:122-127, 1797. Translated from French. Belov and Associates, Denver, Colo., 4p., June 2, 1970.

Several experiments were conducted to determine the effects of mercury and mercury oxide on plants. When mint and bean plants were placed next to a bottle of mercury, the leaves and stems were covered with black spots on the third day, and then turned completely black. A mint plant and mercury were placed under a bell-glass whose sides were coated with sulfur. The plant remained intact, indicating that sulfur prevents the harmful effects of mercury. No damage was observed when the mercury was covered with water. The experiments also showed that mercury is not harmful unless it is mixed with water or soil, or is in contact with the roots of the plants. Mercury oxide killed a mint plant when placed in contact with the roots. Beans planted in soil mixed with mercury oxide became feeble and disfigured; beans planted in a mixture of soil and lead oxide continued to grow and were four times as strong as those grown in soil and mercury oxide.

19771

Wehmer-Hannover, C.

ON THE CASE OF INTENSIVE DAMAGE TO A TREE LINED AVENUE BY ESCAPING COAL GAS. (Uber einen Fall intensiver Schadigung einer Allee durch ausstromendes Leuchtgas). Pflanzenkrankheit, vol. 10:267-269, 1900. Translated from German. Belov and Associates, Denver, Colo.

The effects of a coal gas pipeline leak on a tree lined street are discussed. The withering originated in the root system, followed by the death of the bark along the base of the tree trunks. A damage center was established, and the damage decreased with increasing distance from the center. Five trees which were totally destroyed stood next to or opposite each other, so that the center must be between them. This damage center coincided with the position of a gas pipe which crossed the five trees. In spite of hibernation, a few weeks were sufficient to destroy the root system of several trees. A sewer construction project is assumed to be the cause of the sudden gas leak. It is known that coal gas is a plant poison, but little is known about the component in question. The damaging effect during hibernation indicates that this is not the result of plant food intake, but of a penetration of the root system.

19773

Schmidt, H.

OBSERVATION OF COAL GAS DAMAGE TO FRUIT TREES. (Beobachtung uber Gasschaden an Obstbaumen). Deut. Baumschule, vol. 3:10-12, 1951. Translated from the German. Belov and Associates, Denver, Colo.

The effects of chlorine gases, resulting from coal combustion, on vegetables and fruit trees are discussed. Damage to spinach, lettuce, endives, rhubarb, onions, peas, and cauliflower was observed in all cases. This damage resulted in a discoloration of the leaves until they were withered and brown. The vegetable plants recuperated according to the degree of damage especially when there was sufficient moisture. String beans, red beans, cabbage, and brussel sprouts were also heavily damaged during the fall of 1950. It was found that among the fruit trees the apple is the most sensitive. The leaves began to shrink, showed a dull pale green discoloration, and fell off within a short period of time. Depending on the degree of damage, loss of leaves was followed by a loss of young fruits. Well growing pear species were less damaged than the weaker growing species. Peaches and apricots lost their leaves during the spring after a pale green discoloration, and also lost some fruit. Among the berry-bearing fruits, gooseberries lost leaves and fruit, currants showed brown coloration of the leaves, and raspberries and blackberries suffered no damage. These observations indicate that considerable damage can be inflicted on cultured plants by industrial waste gases.

19873

Garber, K.

EFFECTS OF FLUORINE. PERTAINING TO THE FLUORINE CONTENT OF PLANTS (1). (Fluor-Wirkungen). Federal Inst. of Applied Botany, Hamburg (West Germany), RR-14, p. 42-48, 1967. 10 refs. Translated from German. Belov and Associates, Denver, Colo., 8p., May 26, 1970. (Also: Qualitas Plant. Mater. Vegetabiles, 15(1):29-36, 1967.)

Several years of research on the fluorine content of plants in non-industrial regions have shown that the natural fluorine content may vary between 0.2 and 2.0 mg/100 g dry matter. The uptake of fluorine from the soil will continue independent of the fluorine content of the soil. From these investigations, it was concluded that fluorine contents higher than the natural values indicate the influence of fluorine emissions. The fluorine contents of various plants are presented in tabular form.

19891

Sierpinski, Zbigniew

COMBATTING OF THE EXOTELEIA DODECELLA L. (Bekampfung der Kiefernknospenminiermotte.) Anz. Schaedlingskunde, 41(7):106-107, 1968. 5 refs. Translated from German. Belov and Associates, Denver, Colo., 6p., May 16, 1970.

The Exoteleia dodecella L. is one of the most widely spread forest parasites in Poland. These insects occur in large quantities in young pine cultures on poor soils and within regions of industrial atmospheric pollution. The caterpillars of Exoteleia dodecella L. feed sucessively on 2-3 needles during the late summer and fall and after hibernation in spring. Full grown caterpillars insert themselves by feeding into the buds for their subsequent pupation. Over areas where this insect occurs in large masses, all buds are destroyed resulting in permanent trunk deformations, growth inhibitions of the trees, and formation of dwarf shapes. Because of the damage to large areas of pine forests, Exoceleia dodecella L. is being combatted by contact poisons. It is recommended that this be done in the spring when the caterpillars are leaving the needles and beginning to invade the buds. Best results are obtained with emulsion-type contact poisons, such as 2% Foschlor 30, 2% Tritox 30, and 5% Azotox M 25. Good results are obtained by using these compounds, which can penetrate the inhabited needles and buds and which have a long period of toxicity, and by using the proper equipment.

19949

Halbwachs, G.

INVESTIGATIONS ON DIRECTED ACTIVE FLOW AND MATERIAL TRANSFORT IN THE LEAF. Flora (Jena), vol. 153:358-372, 1963. Translated from German. Belov and Associates, Denver, Colo., 34p., Feb. 20, 1970.

Damage by acidic gases, such as sulfur dioxide, hydrochloric acid, and hydrogen fluoride, is expressed in leaves as irregular necrotic spots distributed across the entire leaf surface, or as localized necrosis at the leaf edges and tips. The acidic gases enter the interior of the leaf through the pore openings. Thus, their opening condition is of importance for the extent and speed of damage. Spot-shaped necroses appear in the direct area of the entry locations as a result of tissue damage from high concentrations. Edge and border damage occurs only at low concentrations, which are different for the individual acidic gases, depending on their toxicity. This localization of damage requires transporting the gases toward the leaf edges and tip, and an effective suction at these leaf parts. The existence of such a suction effect, which is significant with respect to the problem of water and substance distribution in the leaf, was made probably by experiments with cut branches, allowing them to absorb dilute HCl and sodium hydroxide solutions and chromium fluorides. The results showed that the preconditions for water and substance flow in the leaf are created by leaf pressure and evaporation, but that the finer distribution in the leaf is regulated by the leaf itself. (Author summary modified)

20185

Kielstein, P.

INFLUENCE OF SOME TRACE ELEMENTS ON THE CAUSATIVE AGENTS AND THE COURSE OF DERMATOMYCOSES IN CATTLE. (Ueber den Einfluss einiger Spurenelemente auf die Dermatomykosen beim Rind und ihre Erreger). Dermatol. Wochschr., vol. 151:750-755, July 10, 1965. 4 refs. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 10p., Sept. 16, 1969.

The role of immunobiological and contributory factors in the development of bovine trichophytosis was investigated in a two-part study. In the first part, black cattle hair from 124 normal and diseased black-spotted lowland cattle was analyzed for iron, copper, manganese, and cobalt contents to determine the effect of the trace elements on the course of trichophytosis. Cattle with high iron levels in their hair tended to be affected less frequently and to develop milder symptoms at a later date than animals with low iron values. In vitro studies were next conducted on the effects of iron and copper on the growth of the fungus Trichophyton verrucosum, the most frequent causative agent of bovine trichophytosis. Traces of copper had no influence on oxygen consumption, but increasing concentrations (16-40 mcg/ml) significantly stimulated fungal growth. Concentrations of 240 mcg/ml and higher caused a statistically significant inhibition in the growth of Trichophyton mentagrophytes. Similar results were obtained in the studies of the effects of iron on oxygen consumption of the Trichophyton mentagrophytes. Although iron stimulated oxygen consumption in the first 72-96 hours of the experiment, oxygen consumption after 120 hours in media containing 50-200 mcg of iron/ml was equal to or lower than that of iron-free controls. At levels above 300 mcg, oxygen consumption was distinctly lower than in iron-free fungal suspensions. It is concluded that these elements are activators of fungal metabolism, with their fungistatic effects dependent on concentration and, in the case of iron, on time.

20551

Berge, H.

EMISSION DAMAGE IN FORESTRY. (Skody imisemi v lesnim hospodarstvi). Scientific and Technical Society, Prague, (Czechoslovakia), Agriculture and Forestry Section, Proc. Conf. Effect Ind. Emissions Forestry, Janske Lazne, Czechoslovakia, 1966, p. XXII-1 to XXII-16. 6 refs. (Oct. 11-14.) Translated from Czech., Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, April 24, 1969.

The concepts of absolutely pollution-resistant and fully industry-proof woody plants, which appear especially in forestry textbooks and catalogs, are not true. Forestry is in a worse situation with respect to combatting pollution in comparison with agriculture. Continuous efforts are exerted to achieve the highest standards of soil fermentation. However, optimum nutrition is not always achieved. Examples of Pinus griffithi, Pinus silvestris, Abies concolor, Picea emorika, all leaved trees and confiers, Plantanus acerifolia, Picea oungens, and Juniperus chinensis pfitzeriana show which combined agrochemical and soil problems acquire primary importance in the process of damage assessment. Frequently, conifers are more resistant than leaved trees to emission damage, especially in conditions of intensified fertilizations along with standard liming or application of individual fertilizers in accordance with orographic data and imitation action. With considerations such as type and origin of the plant, together with the type of emission and the use of impact fertilization, emission damage is greatly reduced and sometimes even completely eliminated. This phenomenon was discussed, along with the effects of nitric and phosphoric acid and lime fertilization. It was shown why no general formulas exist for calculating emission damage possibilities and why rigid chemical and mathematical determination systems must be described as unrealistic. It was concluded that more trees and more forests in the vicinity of industrial centers and housing estates are needed. A mixed forest appears to be the most important producer of oxygen and most efficient filter of waste gases, smoke, and dusts. (Author abstract modified)

20981

Zelinka, Rudolf

SMOKE-CAUSED DAMAGE IN UPPER AUSTRIA, ESPECIALLY IN THE LENZING AREA. (Kourove skody v Hornim Rakousku zvlaste v okoli Lenzingu) Scientific and Technical Society Prague Czechoslovakia Agriculture and Forestry Section, Proc. Conf. Effect Ind. Emissions Forestry, Janske Lazne, Czechoslovakia, 1966, p. V-1 to V-9. (Oct. 11-14.) Translated from Czech. Franklin Inst. Research Labs., Philadelphia Pa., Science Info. Services, April 24, 1969.

A brief historical review of smoke damage to forestry caused by several large factories in Upper Austria and measures being currently taken are given. Spruce, fir, and pine are particularly sensitive to smoke. The area in which the forests are attacked by smoke amounts to about 1,850 ha in Upper Austria. A compensation chart was constructed according to the degree of damage. The losses were assessed empirically in terms of the growth increment from results of research conducted by experts from factories causing the smoke damage on a scientific basis. As a result, the heavy attacks of sulfur dioxide were reduced in 1965 to about one third of the value of previous years. Deciduous trees were planted; attention was given to the cultivation of spruces and white pines that will be comparatively resistant to exhaust gases from industrial plants. The grafting technique was adopted; various mineral fertilizers were used. The costs pertaining to the conversion of stands, means of protection against gnawing by wildlife, maintaining of the cultures, and measures against the bark-boring beetle were fully covered by the factories.

20982

Spaleny, J.

EFFECT OF FLUE DUST FROM POWER STATIONS ON GERMINATION AND PHOTOSYNTHESIS OF HIGHER PLANTS. (Vliv elektrarenskych popilku na kliceni a fotosyntezu vyssich rostlin.) Scientific and Technical Society, Prague (Czechoslovakia), Agriculture and Forestry Section, Proc. Conf. Effect Ind. Emissions Forestry, Janske Lazne, Czechoslovakia, 1966, p. XXI-1 and XXI-12. (Oct. 11- 14.) Translated from Czech. Franklin Inst. Research Labs., Philadelphia, Pa. Science Info. Services. April 24, 1969.

Experiments were conducted to test the inhibitory effects of certain constituents of power plant dusts on the metabolism of plants. Dust samples provided a total spectrum of the sizes of dust particles. Feeding cabbage was used as the model plant because of its comparatively intensive photosynthetic activity. Germination was realized in Petri dishes located in a thermostat at the temperature of 20 C and exposed to illumunation of 700 lux. Illumination lasted for 8 hrs and occurred every 24 hrs. The water layer in the individual dishes was high enough to cover the seeds without blocking sufficient air access. Acid flue dust (pH 4.3) significantly inhibited both germination and growth. Less acid flue dust (pH 5.3) had no influence, and neutral flue dust (pH 6.4) exerted a positive effect. Results showed that dusting of the upper side of the leaf exerts more influence on the inhibition of photosynthesis than dusting on the lower side of the leaf. This is mostly due to the fact that more flue dust will adhere to the upper side, and both the choking of vents and the light screening from the flue dust layer will be evidenced on the surface of the leaf. Results showed that the soluble component of flue dust also inhibits photosynthesis. Flue dust made wet by water mist is a less active inhibitor of photosynthesis. In a microscopic comparison of dry and wet flue dust, accumulation of dust particles occurs which evidently leads to some dechoking of certain vents, and the dust screen acting against the incident light will be partially decomposed.

21062

Sobocky, E.

PRELIMINARY RESULTS OF ECONOMIC AND SYLVICULTURAL MEASURES AGAINST THE EFFECTS OF FLUORINE IN THE REGION OF ZIAR N.HRONOM. (Predbez vysledky lesnickohospodarskych opatreni proti pusobeni fluoru v oblasti Ziaru n.Hronom). Scientific and Technical Society, Prague (Czechoslovakia), Agriculture and Forestry Section, Proc. Conf. Effect Ind. Emissions Forestry, Janske Lazne, Czechoslovakia, 1966, 10 refs. (Oct. 11-14.) Translated from Czech. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, p. XIII-1 to XIII-13. April 24, 1969.

Results of research and sylvicultural and economic measures taken to reduce the harmful effects of emissions in the area of Ziar N.Hronom were summarized. The source of the emissions was a metallurgical plant producing aluminum. The sylvicultural measures were first directed toward the most severely attacked zone I of the area, and on non-sylvan areas, which were not used to grow trees, located within the reach of the maximum smoke attack between the forest boundary and the plant. In zone I, practically all degrees of injury were found, starting with depigmentation and necrosis formation in assimilation organs, up to the loss of foliage and decay of conifers. From among four-year plants on unforested land, which were subjected to various cultivation operations including mineral fertilization, best results were obtained for black alder, birch, red oak, pedunculate oak, and Austrian pine. Fertilization with lime and ground Thomas slag proved efficient only in the case of black alder. A much better result was provided by hoeing and mowing. Successful foresting depends not only on exposure to the emitting source, but also on a lower HF concentration. Terrian relief creates a natural barrier to penetrating emissions. The beech stand, situated 2110 m eastward of the emitting source, reduced the detrimental effect of HF in its above surface layer by approximately 30% in comparison to a free area in front of the stand boundary. A ten-year pine culture, 1950 m south-southeast from the source, reduced the harmful effect of HF by approximately 50% by comparison to total clearing, and thus fulfilled the protective function by being in front of the sheltered trees.

21081

Tollinger, V.

CRITERIA FOR EVALUATION OF THE RATE OF INJURY OF FOREST TREES WHICH ARE UNDER CONSTANT EXPOSURE TO INDUSTRIAL EMISSIONS. (Kriteria pro posouzeni miry poskozeni lesnich porostu chronicky poskozovanych prumyslovymi exhalacemi). Scientific and Technical Society, Prague (Czechoslovakia), Agriculture and Forestry Section, Proc. Conf. Effect Ind. Emissions Forestry, Janske Lazne, Czechoslovakia, 1966, p. XX-1 to XX-14. 3 refs. (Oct. 11- 14.) Translated from Czech. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 17p., April 1969.

A method is developed mathematically to express dynamic long-term injury to whole groves as trees, as opposed to present static methods of describing injuries to organs of individual trees. Injuries to groves by gaseous emissions can be characterized, according to this method, by rate of injury, derived from the relationship between performed (random) processing of tree reserves and the processing prescription (permissible processing). Results can eventually indicate the percent of reduced growth increment, and, to some degree, the future course of injury. The method was verified by application to the forest farm Janov, located in Krusne hory. It was found that random processing of spruce trees had greatly exceeded permissible processing; the structure of random processing shows a continuing increase in the proportion of processed dry woods. Injury to the grove has reached the point where the existence of the entire forest in the region of the Krusne hory ridge is threatened, and because of increasing industrial emissions, is likely to increase. Results from this method of determining the rate of injury of older trees correlated with findings of investigators using other approaches. (Author summary modified)

21098

Schonbeck

INVESTIGATION OF THE SUITABILITY OF LICHENS AS INDICATORS OF AIR CONTAMINATION. (Pruzkum vhodnosti lisejniku jako indikatoru znecisteni vzduchu). Scientific and Technical Society, Prague (Czechoslovakia), Agriculture and Forestry Section, Proc. Conf. Effect Emissions Forestry, Janske Lazne, Czechoslovakia 1966, 2p. Oct. 11-14.) Translated from Czechoslovakian. Franklin Inst. Research Labs, Philadelphia, Pa., Science Info. Services. April 24, 1969.

The suitability of lichens as indicators of urban air pollution was demonstrated by transplanting the lichen Parmelia physodes to the trunks of the oak Quercus sessiliflora in 10 localities in the Ruhr. Different types of emissions of various concentrations were observed to cause different degrees of decay in the lichens. Similarly, lichens transplanted to a region of iron roasting sheds found to decay after exposure to the sulfur dioxide emitted by roasting operations.

22232

Bredemann, G. and H. Radeloff

ON THE DAMAGE TO PLANTS BY AMMONIA GASES AND THEIR IDENTIFICATION. (Ueber Schadigung von Pflanzen durch Ammoniak-gase und ihren Nachweis). Z. Pflanzenkrankh. Pflanzenschultz, vol 42:457-465, 1932. 21 refs. Translated from German. Belov and Associates, Denver, Colo., 16p., May 31, 1970.

Studies were conducted to compare the effects of exposure to ammonia on potted trees, potted flowers, and full-grown tomatoes kept in the light with the effects observed on the same plants kept in the dark. Trees kept in the dark and exposed for two hours to approximately 1:4000 NH_3 always suffered more severe damage than trees kept in darkness. However, the difference was not as pronounced as that recorded for sulfur dioxide damage and was confined to a narrowly limited range of concentrations. Darkness did not protect trees against increased NH3 concentrations as it does against high SO2 concentrations. Among the six tree species tested, ash was the most susceptible to NH3 damage and oak, maple, and sitca spruce the least susceptible. Intermediate positions were occupied by beech and rose trees. This classification of trees according to their resistance coincides with the results of tests for the effects of SO2. As confirmed by the tests with tomatoes and flowers, NH3 damage is characterized by the decomposition of chlorophyll and the precipitation of tannin and is thus confined to green leaves. The crown leaves of flowers and tomato blossoms were not damaged by exposure.

22619

Singer, Maximilian

ON THE EFFECT OF A LABORATORY ATMOSPHERE ON THE GROWTH OF POTATO SPROUTS. (Uber den Einfluss der Laboratoriumsluft auf das Wachst Kartoffelsprosse). Ber. Duet. Botan. Ges., vol. 21:175-180, 1903. 3 refs. Translated from German. Belov and Associates, Denver, Colo., 9p., June 2, 1970.

The growth of potato sprouts under the influence of a laboratory atmosphere in which coal gas was present was investigated. When a potato shoot approximately 7 cm high and several smaller shoots which were grown in a greenhouse under a bell jar, were placed in a laboratory room, the shoots twisted from a vertical to a horizontal direction. If potatoes were brought into the laboratory and covered with a layer of water, they continued to grow in a vertical direction. It was confirmed that the twisting of the shoots was no due to heliotropism, humidity, or hydrotropism; the reason for the twisting was the effect of the impure laboratory atmosphere which contained coal gas. A coal gas concentration of 0.1% induces twisting and thickening in the potato sprouts. If the concentration is reduced to 0.002%, no twisting of the main sprout is produced.

22621

Materna, Jan and Rudolf Kohout

THE ABSORPTION OF SULPHUR DIOXIDE BY SPRUCE AND PINE TREES. (Naturwissenschaften (Berlin), 50(11):407, 1963. 1 ref. Translated from German. Belov and Associates, Denver, Colo., 2p., Dec. 30, 1969.

During an investigation of the composition of spruce and pine needles in stands damaged by smoke, the sulfur content of the needles increased in the winter. Part of this accumulation can be explained by the weight loss that occurs in winter and the relative accumulation of the content material that this causes; in heavily damaged trees the increase is so large that this explantaion is insufficient. Investigations were conducted to determine if sulfur dioxide was assimilated by the needles during winter. Marked sulfur dioxide, SO2(35), was used for this purpose. In 15 to 25 year old, healthy, free-standing spruce and pine trees, a well developed branch was wrapped in a polyethylene bag. An ampule of SO2 was crushed in the bag producing a concentration of 8-10 mg SO2/cu m of air. Needle samples were taken after 24 hours and at regular intervals. The results showed that the needles of the treated branch absorbed almost the entire quantity of SO2. A small amount of the sulfur was transported to ungassed needles in other parts of the crown, but it was intensively stored in needles of newly formed shoots. Similar experiments showed that SO2 is also absorbed at night.

22622

Noack, Kurt

INVESTIGATIONS OF SMOKE GAS DAMAGES TO VEGETATION. (Untersuchunge uber die Rauchgasschaden der Vegetation). Z. Angew. Chem. (Weinheim), vol. 42:123-126, Jan. 3, 1929. 6 refs. Translated from German. Belov and Associates, Denver, Colo., 12p., May 27, 1970.

Investigations were conducted to determine if nitrous gas, hydrochloric acid, and ammonia cause plant damage similar to that caused by sulfur dioxide, and to determine the participation of the iron contained in chloroplasts in this disease process. The assimilation apparatus in the moss fontinalis was primarily affected by nitrous gas and these effects corresponded to the effect of SO2; HCl had a lesser effect, and ammonia was not considered to be an assimilation poison. Clover, tobacco, and spinach plants exposed to nitrous gas became withered and bleached with inhibited assimilation after exposure to light. Plant damage by SO2 and nitrous gas consists of a fixation of iron followed by a photooxidative poisoning of the protoplasm by chlorophyll. Tests on corn were conducted to determine if the water soluble part of iron increases after introducing assimilation poisons. Pre- treatment with fuming nitric acid resulted in a water soluble iron content four times higher than normal. The effect of smoke gases on plants consists of a direct cancellation of the catalytic activity of the iron in the chloroplasts. The photooxidative poisoning of the protoplasm is considered to be a secondary effect.

22952

Boussingault, M.

PLANT PHYSIOLOGY- ON THE DELETERIOUS ACTION THAT THE VAPOR EMANATING FROM MERCURY EXERCISES ON PLANTS. (Sur l'action deletere que la vapeur emanant du mercure exerce sur les plantes). Compt. Rend., vol. 64:924-929, 1867. 2 refs. Translated from French. Belov and Associates, Denver, Colo., 9p., March 12, 1970.

The effects of mercury vapor on plants were investigated. When a mercury-filled capsule was placed on each side of a petunia stem, the leaves turned black, withered, and were hanging. Another petunia, enclosed under a dish-cover where there was no mercury, retained all its vigor. Experiments were also conducted on mint plants. On the inner surface of one dish-cover sulfur was placed on the flower. In the other dish cover there was no sulfur. In less than 52 hours, the mint leaves in the dish containing only mercury had been completely destroyed. The leaves of the plant in the dish also containing sulfur were not affected. It was concluded that mercury vapor has a damaging effect on vegetation, and that the presence of sulfur counteracts this effect.

23041

Materna, Jan

THE INFLUENCE OF SULFUR DIOXIDE ON THE MINERAL COMPOSITION OF NEEDLES FROM SPRUCES. (Einfluss des Schwefeldioxyds auf die mineralische Zusammensetzung der Fichtennadeln). Naturwissenschaften (Berlin), 48(23):723-724, 1961. 3 refs. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 3p., Oct. 22 1969.

The question of whether mineral substances other than sulfur, silicic acid, and iron accumulate in the assimilating organs of smoke injured plants, particularly cations such as calcium, potassium, and magnesium is analyzed. Since analyses of injured needles alone cannot provide definite results, gassing tests with older spruces were performed. Two twigs were packed into polyethylene bags; one was gassed with air and sulfur dioxide, the other with pure air. Not only did the gassing increase the sulfur content, but also that of Ca and Mg; it caused a considerable increase of water soluble magnesium. A second gassing experiment was performed, which yielded no difference in the concentrations of Ca and Mg, but a markedly higher potassium content was found.

23188

Amirov, R. O. and A. R. Ismaylov

INDUSTRIAL WASTES OF THE CITIES OF BAKU AND SUMGAIT AND THEIR EFFECT ON GREEN PLANTINGS. In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature. Effects and Symptoms of Air Pollutes on Vegetation; Resistance and Susceptibility of Different Plant Species in Various Habitats, In Relation to Plant Utilization for Shelter Belts and as Biological Indicators. M. Y. Nuttonson (ed.), vol. 2, Silver Spring, Md., American Institute of Crop Ecology, 1969, p. 6-7. (Also: Akad. Nauk SSSR Ural. Filial. Komis. po Okhrane Prirody. Rastitel' nost' i promyshlennye zagryazneniya. Okhrana prirody na Urale. V (Sverdlovsk), 1966, p. 37-38.) The industrial centers of the Apsheron Peninsula discharge a great amount of wastes, particularly carbon monoxide, sulfur dioxide, fluorine compounds, hydrocarbon vapors, chlorine, and hydrogen sulfide. In most cases, these compounds adversely affect green plants which function, at times, as protection against gas and smoke. When the air is polluted by irritant gases dark brown burns appear on the leaves. Partly withered and some yellowed leaves are also found. The toxic action of these pollutants also affects the root system. Trees which exhibit gas resistance include elm, maple, pistachio, oleaster, almond, honeysuckle, and others. The establishment and development of green trees are important as a means of combatting air pollution and for the sanitary well-being of the industrial areas. Several recommendations for establishing green plantings in industrial areas are included.

23260

Cormis, Louis de

PLANT PHYSIOLOGY--EMISSION OF SULFURATED HYDROGEN BY PLANTS SUBJECTED TO AN ATMOSPHERE CONTAINING SULFUROUS HYDRIDE. (Degagement d'hydrogen sulfure par des plantes soumises a une atmosphere contenant de l'anhydride sulfureaux). C. R. Acad. Sci., Paris, 264(1):683-685, Feb. 12, 1968. 3 refs. Translated from French. Belov and Associates, Denver, Colo., 6p., March 5, 1970.

Tomato plants placed in a lighted chamber to which 2-5 ml of sulfur dioxide were admitted emitted 145 microgram/cu m hydrogen sulfide at the end of 15 min; 89 microgram/cu m at the end of 30 min; 13 microgram/cu m at the end of 45 min; and traces of H2S at the end of 60 min. The release appeared to be conditioned by light, since plants treated in the dark produced no emission. Though some of the H2S was traced to the sulfur content of the plants, the greater portion originated in the reduction of atmospheric SO2 by the plants.

23386

Cormis, L. de

ABSORPTION AND ACCUMULATION OF ATMOSPHERIC FLUORINE BY THE LEAVES OF CERTAIN HERBACEOUS PLANTS. (Absorption et accumulation du fluor atmospherique par les feuilles de certains vegetaux herbaces) Ann. Physiol. Veg., 10(4):251-262, 1968. 16 refs. Translated from French. Belov and Associates, Denver, Colo., 24p., June 18, 1970.

The effects of atmospheric fluorine compounds, such as are emitted from aluminum industries, on various leafy plants are investigated. Tomato, bean, and tobacco plants were grown under controlled conditions and subjected to varying hydrogen fluoride concentrations and different atmospheric conditons. The rate of absorption of atmospheric fluorine is clearly proportional to the concentration, time of exposure, and relative humidity. The fluorine is accumulated near the edges of the leaves and results in necroses in that area. The level of toxicity varies from plant to plant. It can be attained from a heavy concentration of short duration, or more probably from a semi-permanent pollution of low concentration. The difference between fluorine and sulfur dioxide absorption is explained.

23576

Bolay, A. and E. Bovay

OBSERVATIONS ON THE SENSITIVITY TO FLUORINATED GASES OF SOME PLANT SPECIES OF VALAIS. (Observations sur la sensibilite aux gaz fluores de quelques especes vegetales du Valais). Phytopathol. Z., vol. 53:290-298, 1965. 11 refs. Translated from French. Belov and Associates, Denver, Colo., 17p., June 18, 1970.

Observations made over a period of 15 years on the relative sensitivity of various plants to fluorine compounds are reported. The three methods used in evaluating damage to plants are: observation of typical necroses appearing on the foliage, chemical analyses of the fluorine content of the plants, and utilization of certain indicator species to detect fluorine. Examinations of tree leaves permit the establishment of sensitivity limits. No injury occurs below 25 ppm, variable reactions occur from 25-105 ppm, depending on the climate and health of the plants, and burns are almost always present from 105 ppm on. Plant species are separated into 4 classes based on their sensitivity. The most sensitive plants can be used as indicators of the presence of fluorine, both in terms of the degree of contamination and the limits of the contaminated zone.

23583

Scholl, G.

A CONTRIBUTION TO THE RECOGNITION PROBLEM OF PLANT DAMAGE INDUCED BY IMMISSIONS. (Ein Beitrag zum Problem der Erkennung von immissionsbedingten Pflanzenschadigungen). Schriftenreihe Landesanstalt Immissions- und Bodennutzungsschutz Lands Nordrhein- Westfalen (Essen), 1969:73-79. Translated from German. Belov and Associates, Denver, Colo., 15p., July 1, 1970.

Turnips, barley, and trees growing on farms bordering a fertilizer manufacturing plant and a refinery exhibited disturbed growth, partial defoliation, and leaf discoloration. When sulfur dioxide emissions in the area were determined to be of a magnitude sufficient to cause plant damage, the question of emission effect on the fertility of soil was clarified in corresponding soil investigations. Soil analyses revealed a 30-50% decrease in 'root soluble' nutrients, significantly lower pH values, and a decreased base activity that correlated with an abnormally high sulfate content in the soil as well as in spring water and rivers. These results show that the acidifying action of sulfur dioxide can have an adverse influence on the alkaline balance of light soil.

23624

Hais, K. and J. Masek

EFFECTS OF SOME EXHALATIONS ON AGRICULTURAL ANIMALS. (Ucinky nekterych exhalaci na hospodarska zvirata). Ochrana ovzdusi, 1969:122-125, Aug. 1969. 15 refs. Translated from Czech. Belov and Associates, Denver, Colo., 14p., June 16, 1970.

The effects of various pollutants on farm animals are discussed. The emissions from such sources as power plants, metal processing, cement works, chemical industries, fertilizing, and nuclear installations are described. The effects of the various pollutants can vary, depending upon such factors as concentration, climate, age of animals, health of animals, and individual sensitivity. Inhalation of ashes, cinders, or other light particulates causes irritation and inhibits important digestive processes. Sulfur dioxide irritates mucous membranes and disrupts metabolic processes. The symptoms of acute and chronic arsenic poisoning are discussed. A considerable degree of toxicity for cattle is noticed from power plant ashes. Bees show a marked effect from exposure to arsenic compounds. Typical symptoms of fluorosis in cattle are dental changes. Synergistic effects of pollutants are mentioned. The general air quality of Czechoslovakia is discussed, and current legislation, including air quality standards, is described. An estimation of economic damages due to air pollution is given.

23625

Schonbach, H., H. G. Dassler, H. Enderlein, E. Bellmann, and W. Kastner

ON THE DIFFERENT INFLUENCES OF SULFUR DIOXIDE ON THE NEEDLES OF VARIOUS TWO YEAR OLD LARCH HYBRIDS. 10. PUBLICATION OF THE STUDY COMMITTEE FOR FLUE GAS RESEARCH IN FORESTRY, THARANDT. (Ueber de unterschiedlichen Einfluss von Schwefeldioxid auf die Nadeln verschiedener Zjahriger Larchenkreuzungen. 10. Veroffentlichung der Arbeitsgemeinschaft fuer forstliche Rauchschadenforschung Tharandt). Study Committee for Flue Gas Research in Forestry, Tharandt (West Germany), Pub. 10, p. 312-316, 1964 (?). 12 refs. Translated from German. Belov and Associates, Denver, Colo., 10p., July 6, 1970.

Research involving the development of sulfur dioxide-resistant coniferous trees is described. The larch tree was selected for breeding, since it looses its needles in the winter, similar to deciduous trees, which are more resistant to SO2. Two year old larches developed from directed cross-pollination, partly from European larches and partly from the Japanese larch, were exposed in a controlled atmosphere greenhouse for periods of 10 to 50 hours to SO2 concentrations of 0.34 to 0.73 ppm. Damage evaluation was standardized by a needle-damage scale of 1-10. On the average, all hybrid trees exhibited a greater resistance to SO2 than the pure trees. Hybrids from two different strains of Japanese larch had significantly different responses. The degree of resistance of the various breeds is based mostly on genetics. This indicates that the development of a resistant strain from direct cross- pollination is a promising possibility.

23639

Bredemann, G. and H. Radeloff

FLUORINE ABSORPTION THROUGH THE BARK OF SHOOTS AND ITS EFFECTS. Angew. Botan., vol. 19:172-181, 1937. Translated from German. 10p.

The effects of fluorine absorption on the shoots of plants and trees are investigated. The primary goal of the research is to determine whether the fluorine compounds which penetrate the bark of the shoots in an earlier season can affect the spring growth of the plant and/or effectively disturb the identification of fluorine fume damage on spring growth. Shoots accumulate fluorine-containing waste gases more or less in their barks, as much a result of exposure in winter as in summer. They are also capable of, but seldom do, store up accumulations in the xylum in water soluble and insoluble forms. The blossoming of branches and the further development of new growth are not noticeably injured by the fluorine compounds which are stored in the bark. All new outgrowths of fluorine-containing branches remain free of fluorine in a fume-free atmosphere. Proven fluorine content in spring growth is regularly a proof of a new fluorine fume effect during or after the blossoming.

23678

Pelz, Eberhart and Jan Materna

STUDIES OF THE PROBLEM OF INDIVIDUAL SMOKE RESISTANCE OF SPRUCES. (Beitraege zum Problem der individuellen Rauchhaerte von Fichte). Arch. Forstw., 13(2):177-210, 1964. 17 refs. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 51p., Oct. 16, 1969.

A study of damage to spruce trees due to air pollution is presented. About 900 trees were studied and grouped into resistance classes according to their phenotypical smoke resistance. Relationships between age, quality of growth site, degree of needle coverage, and weather conditions were determined. Trees in different classes exhibited different growth patterns, due to different physiological activities of the trees. Trees sensitive to damage had higher concentrations of sulfur in their needles, due to a higher degree of sulfur dioxide intake. Intensive studies of the needles indicate differences between sensitive and non-sensitive spruces in terms of water circulation, glycides, amino acids, and potassium levels. These results can be practically utilized in forestry by providing valuable help in cultivating forest trees which are smoke resistant.

23689

Materna, Jan

PARTIAL RESULTS OF RESEARCH IN THE SMOKE REGION OF THE KRUSNE HORY MOUNTAIN RANGE. (Nektere vysledky vyzkuma v krusnohorske kourove oblasti). Translated from Czech. Belov and Associates, Denver, Colo., 19p., Jan. 20, 1970.

Following the rapid advance of damage by smoke emissions to forest flora in the eastern section of the Krusne Hory mountain range, sulfur dioxide measurements were taken in the most affected areas. Where sulfur dioxide was present, the average concentration was one mg per cu m of air. The influence of precipitation on this concentration is considerable, as is that of fog and, to a lesser extent, wind direction. The measured concentrations are high enough to cause a decrease in production and damage to plant life. They correspond to calculated and measured values of the sulfur content in the assimilative organs of injured plants. Further research indicated that fertilizers will increase the resistance of assimilative organs of the plants and promote new growth, even in trees highly sensitive to SO2. Related investigations pertained to the possibility of using forest flora, especially spruce, to indicate the action of smoke gases and their presence in the atmosphere and to the significance of forest flora for cleaning air in industrial regions. Based on measurements of sulfur in needles and the turbidity of water extracts of needles, it is concluded that spruce trees are suitable for proving the influence, and its extent, of smoke emissions. Forest flora are shown to have only a negligible role in air purification near large enterprises. On the other hand, their ability to absorb sulfur dioxide is great enough for them to have a prominent role in purification where sulfur dioxide levels do not exceed 0.2 mg per cu m of air.

23874

Kotte, W.

SMOKE DAMAGE TO STONE FRUIT. (Rauchschaden an Steinobst-Fruchten). Nachrbl. Deut. Pflanzenschutzdienst (Berlin), no. 9:91-92, 1929. Translated from German. Belov and Associates, Denver, Colo., 4p., Sept. 8, 1970.

Of the fruit trees in the neighborhood of a brickyard, the apples and cherries were undamaged, while in contrast the damson plums, yellow plums, and yellow Victoria plums showed damage on foliage and fruit. Damage symptoms of the damsom plums were necrotic spots of tissue that appeared either as sunken patches about fingernail size or, in cases of greater extend, as an apical zone of retarded growth. The diseased tissue was coffee brown in color, and beads of sap frequently could be found around the border of the necrotic zone. Microscopic examinations revealed that the epiderma cells were filled with brown granular masses instead of dark blue anthozyan. The pericarpal tissue, which in a healthy condition exhibits vesicular, almost empty appearing cells with transparent walls, was small-celled, with brown colored cell walls covered with brown granular concretions. Limitation of the damage to the end of the fruit is explained by the fact that here the rain drops hold on longest and the gases dissolved in the water have their strongest influence. The cause of the smoke damage is attributed to hydrofluoric acid.

23950

Bovay, E.

EFFECTS OF SULFUR DIOXIDE AND FLUORINE COMPOUNDS ON VEGETATION. (Effets de l'anhydride sulfureux et des composes fluores sur la vegetation). Station Federale de Recherches de Chimie Agricole, Liebefeld-Bern, Switzerland, Air Pollution Proceedings of the First European Congress, on the Influence of Air Pollution on Plants and Animals, Wageningen, Netherlands, 1968, p. 111-135. 81 refs. Translated from French. Belov and Associates, Denver, Colo., 34p., Aug. 28, 1970.

The sources of sulfur dioxide and fluorine pollutants are described and the damage caused to plants by these compounds are related. Sulfur dioxide penetrates to the interior of plants through the stoma; therefor every condition favoring the opening of the stoma also increases the assimilation of SO2. The caustic action of SO2 is due to its reducing action, which can affect plant metabolism. Sensitivity to SO2 depends on such factors as age, nutritive state, and individual tolerances. Relationships between pollutant concentration and time of exposure are a determining factor in threshold limitations. A distinction between plant injury and damage is made. Various attempts to observe and control atmospheric pollution are described. Fluorine compounds are among the most toxic of pollutants. Fluorine accumulation in soils and plants is discussed. The effects of fluorine on various types of plants are noted. Synergistic action can occur when certain elements introduced by fertilizers react with fluorine compounds found in the atmosphere. Most plants seem to have a fluorine threshold beyond which photosynthetic processes can be invisibly damaged. Certain plants, due to their highly sensitive nature, can act as indicators of atmospheric pollution. Recent experiments involving the effects of fluorine on fruit trees are described.

23986

Wentzel, K. F.

SENSITIVITY AND DIFFERENCES IN THE RESISTANCE OF PLANTS TO AIR POLLUTION. (Empfindlichkeit und Resistenzunter schiede der Pflanzen gegenuber Luftverunreinigung). In: Air Pollution on Plants and Animals. Wageningen, Netherlands, Center for Agricultural Publishing and Documentation, 1969, 357-370. 27 refs. Translated from German. Belov and Associates, Denver, Colo., 17p., Sept. 28, 1970.

Until 1940, 2 ppm of sulfur dioxide in the air was supposed to be the maximum acceptable concentration for long duration pollution. Recent experiments in the field in various areas have shown that the limit has to be reduced to 0.02 ppm and for HF it must be considerably lower. It is better to characterize air pollution by the frequency and duration of the times a certain critical concentration is exceeded, rather than by average concentration. The resistance of plants varies with the type of emission, conditions of growth, phase of development, and exposure. A distinction must be made between experimental resistance gauged by leaf sensitivity and resistance in the field measured by yield and endurance. A generally valid sequence of potential damage areas for plants cannot be made, but a scheme for their classification into three groups is given. In order of generally increasing sensitivity, plants can be grouped in the following manner: agricultural crops, decidous forests, gardens and fruit plants, fodder crops, and coniferous forests. This investigation into the sensitivity of plants to air pollution and the differences in their resistance to various types of pollutants has revealed that this can be counted among the most complicated problems of biology. Nevertheless, the illusion is widespread that this matter may be judged casually and simply. Only by recognizing the severity of the problem can progress be made. (Author summary modified)

24024

Radeloff, H.

INVESTIGATION AND APPRAISAL OF FLU-GAS DAMAGE. (Untersuchung und Begutachtung von Rauchschaden). Hamburg Staatsinst. Angew. Botanik Jahresber., vol. 6:126-127, 1939. 1 ref. Translated from German. Belov and Associates, Denver, Colo., 4p., June 12, 1970.

Waste gases containing fluorine and sulfurous acid are reported to damage plants and bees. Branches of fruit trees afflicted by fluorine had leaves which showed numerous spots, intercostal discolored stripes, or also withered tips and periphrasis. All which remained, in some cases, were the blackish brown withered remains of the leaves. At a location in central Germany, the bees of a migrating stand died without any immediately apparent reason. However, they had their hives in the vicinity of a plant working with fluorine, and the mass dying started quite suddenly with the same day on which the wind had changed in their direction. An investigation for sulfurous acid in 36 plant samples resulted in various causes, from manufacturing plant flue gases to gas remnants coming from a habitation treated with sulfur.

24025

Koeck, G.

MILDEW ON OAK TREES AND FLUE-GAS DAMAGE. (Eichenmehlau und Rauchgasschaden). Z. Pflanzenkrankh Pflanzenschultz, vol. 45:1-2, 1935. Translated from German. Belov and Associates, Denver, Colo., 1p., June 18, 1970.

The Oak mildew (Microsphaera alni var. quercina) could not be observed at any location which had been exposed to a considerable amount of flue gases containing sulfurous acid. This was especially evident along the southwest slopes of the Haeusel Mountains which are relatively heavily exposed to the flue gases coming from a paper mill in Hinterburg. Absence of oak mildew and similarly the absence of lichen in forests which also contain oaks can be taken as an indicator for the assumption that the region concerned is strongly exposed to flue gases. If one considers the usual control of the genuine mildew fungus by means of pulverized sulfa, which tranforms under the influence of the atmosphere into sulfurous acid and thus becomes fungicidal, the above observed phenomenon becomes quite understandable.

24063

Bassus, Wilfried

ON THE EFFECTS OF INDUSTRIAL EMISSIONS ON THE POPULATION OF NEMATODA IN THE SOIL OF PINE FORESTS. (Ueber Wirkungen von Industrieexhalaten auf den Nematodenbesatz im Boden von Kiefernwaldern). Pedobiol., vol. 8:289-295, 1968. 7 refs. Translated from German. Belov and Associates, Denver, Colo., 11p., July 2, 1970.

In one of the largest pine regions in the German Democratic Republic damaged by industrial air pollution, the Duebemar Heide, changes in the soil nematode population were studied. By the action of sulfur dioxide, the density of the tree stands decreased considerably and a rich ground vegetation developed. Great amounts of dust containing high quantities of lime have changed the pH value of the humus cover from 3.7 up to 7. The total population density of the nematodes showed a significant reduction and an alteration of the species composition in the areas influenced by smoke. As a consequence of a more intensive microbial activity and a higher pH value, the percentage of semisaprophage, saprophage, and predatory nematodes increased considerably. In the undamaged areas, however, on the semiparasitic nematodes which feed on fungi and roots showed a high population density. The extreme raw humus conditions there seem to be very favorable for them. (Author summary)

24064

Rohmeder, E. and A. von Schonborn

THE INFLUENCE OF ENVIRONMENT AND HEREDITY ON THE RESISTANCE OF FOREST TREES TO THE ATMOSPHERIC IMPURITIES ORIGINATING FROM INDUSTRIAL WASTE GASES. A CONTRIBUTION FOR THE BREEDING OF A RELATIVELY FLUE GAS RESISTANT SPECIES OF SPRUCE TREES. Forstwiss Zentr., vol. 84:1-3, 1965. 9 refs. Translated from German. 20p.

Experiments to determine to what extent the resistance to flue gas can be determined by environmental factors and heredity are described. In addition, the limits of gas concentrations within which young trees can survive and thrive are determined. The environmental factors studied include nutrition, water supply, relative humidity, and others. Varying concentrations of sulfur dioxide and hydrogen fluoride are administered under controlled conditions to determine resistance. Damage increases with increasing humidity and light intensity. An optimum supply of nutrients increases resistance. For SO2, the first damage symptoms occurred after a ten day exposure to 0.5 mg/cu m; at 2.0 mg/cu m all assimilation organs are destroyed. For HF, the first damage symptoms occurred at 0.025 mg/cu m; total damage occurred at 0.25 mg/cu m. The resistance of oak and poplar is much greater than spruce, larch, or fir. Also, the grafts of the resistant strains are more resistant, indicating heredity as a cause of resistance.

24084

Guderian, Robert

INVESTIGATION OF THE QUANTITATIVE RELATIONSHIP BETWEEN SULFUR IN PLANTS AND THE SULFUR DIOXIDE IN THE AIR. PART 2. DIURNAL VARIATION IN SULFUR NEAR UNAFFECTED AND GAS-ATTACKED PLANTS. (Untersuchungen ueber quantitative Beziehungen zwischen dem Schwefelgehalt von Pflanzen und dem Schwefeldioxidgegalt der Luft. Teil 2. Tagesgang im Schwefelgehalt bei unbeeinflussten und begasten Pflanzen). Text in German. Z. Pflanzenkrankh Pflanzenschultz, 77(6):289-308, June 1970. 61 refs. PART I. Ibid., 77(4-5), April-May 1970. PART III. Ibid., 77(7), July 1970.

Fumigation of plants at different hours of the day reveals distinct diurnal changes in sulfur accumulation which exhibits a certain relation to intensity of photosynthesis, but does not coincide with the degree of leaf sensitivity. Apparent photosynthesis and sulfur accumulation reach their maxima in the late morning hours while leaf injury is most intense in the early morning hours. The decrease in leaf sensitivity during the light period seems to be associated with, among others, the formation of assimilates; further possible causes are discussed. Sulfur is also accumulated during the night hours, which may amount to about one-third of the highest daily values. Sulfur content of unfumigated plants also shows a distinct diurnal variation. These diurnal variations result from changes in dry substance. Level of sulfur accumulation varies considerably with the stage of plante growth. Degree of leaf injury on plants of different age does not show a distinct dependence upon the quantity of accumulated sulfur. Sulfur absorption by leaves of the same age decreased with increasing plant age. Fully developed leaves having the greatest photosynthetic gas exchange also had the greatest sulfur accumulation. The relationships in the degree of injury of different aged leaves change in respect to each other with level of concentration. Under exposure conditions of low concentration but of sufficient length to result in injury, older leaves are, in general, injured before younger ones. With increasing concentration, effects shift over to the younger leaves until finally, at high concentrations, the degree of injury on just fully developed leaves correlates with sulfur accumulation and apparent photosynthesis. Conifers also show distinct, age dependent differences in sulfur dioxide uptake and in the degree of injury. The youngest needles absorb the most sulfur dioxide. Sulfur dioxide absorption and also degree of injury increases with increasing growth of the new shoot, while the preceding year's needles show an inverse tendency. Dissimilar sulfur dioxide exposures may shift the natural relations in sulfur content. Long lived crops show an increase SO2 content with leaf age while older leaves on short lived plants often have a lower sulfur content than younger ones. Strictly comparable samples have to be taken when proving sulfur dioxide effects with the help of chemical leaf analysis. (Author summary modified)

24086

Guderian, Robert

INVESTIGATION OF THE QUANTITATIVE RELATIONSHIP BETWEEN SULFUR IN PLANTS AND THE SULFUR DIOXIDE IN THE AIR. PART 3. SULFUR INJURED AND UNINJURED LEAVES. (Untersuchungen ueber quantitative Beziehungen zwischen dem Schwefelgehalt von Pflanzen und dem Schwefeldioxidgehalt der Luft. Teil 3. Schwefelgehalt geschaedigter und ungeschaedigter Blatteile). Text in German. Z. Pflanzenkrankh Pflanzenschultz, 77(7):387-399, July 1970. 50 refs. PART I. Ibid., 77(4-5), April-May 1970. PART II. Ibid., 77(6), June 1970.

The sulfur content of necrotic portions of a leaf and those portions that are still green is determined by the past history of ambient sulfur dioxide concentrations. When an ambient level which causes acute injury is followed by a longer period of no sulfur dioxide or of only insignificant concentrations, then, the sulfur content of those parts still functioning may decrease below that of the necrotic portions. In practice, however, sulfur content of the green leaf portions is generally higher. Great differences in the sulfur content of injured and uninjured parts of the leaf probably result from sulfur dioxide effects and, therefore, are a reason why a separate chemical analysis for sulfur may be advantageous. If no separation is made, only leaves having a small proportion of necrosis should be sampled for (chemical) analysis because these reflect the level of sulfur dioxide pollution better than do severely injured leaves. In addition to the level of sulfur dioxide exposure, sulfur content of plants depends substantially on the duration of pollution-free periods. A single sample taken from vigorously growing, intermittently exposed plants is capable of reflecting only a casual situation. The danger of misinterpretations can be reduced by repeated sampling in the course of the vegetation period. The present results of investigations in both field and fumigation experiments concerning a quantitative relationship between sulfur content in plants and sulfur dioxide content of the air with attention to inner and exterior growth factors, make possible an evaluation of the chemical analysis of the leaf as proof of sulfur dioxide effects. The analysis, along with attention to precisely described presuppositions, is a valuable procedure for identifying sulfur dioxide pollution, also in areas with concentrations causing acute injury. The causes for opposing concepts about the diagnostic value of the analysis of plants could be clarified. (Author summary)

24395

Bolay, A., E. Bovay, C. Nuery, and R. Zuber

RELATIONSHIP BETWEEN FERTILIZATION AND THE BURNING EFFECT OF FACTOR EMISSIONS CONTAINING FLUORIDES. (Interaction entre la fumure et causticite des immissions fluorees). Air Pollution Proc. First European Congr., Influence of Air Pollution on Plants and Animals, Wageningen, The Netherlands, 1968, p. 143-160. 13 refs. Translate from French. Belov and Associates, Denver, Colo., 26p., Sept. 11, 1970.

Studies made of the vineyards and apricot orchards in the central part of the Valais district of Switzerland, an area exposed to atmospheric pollution from aluminum foundries and fertilizer plants show that the causticity of emitted fluorides and the fluorine content of the leaves depend closely on the kind of mineral fertilizer used on the plants. Just how this interaction works is still not known but three possible hypotheses are possible to explain the interrelationship: presence of chlorides, presence of boron and, finally, an unidentified substance, particular to certai phospho-potassium fertilizers. The effect of the fluoride pollutio is made significantly worse by the almost linear diffusion created by the winds of this alpine valley.

24434

Guderian, R.

THE CORRELATION BETWEEN SULFUR CONTENT IN PLANTS AND SULFUR DIOXIDE CONTENT IN THE ATMOSPHERE. (Untersuchungen ueber quantitative Beziehungen zwischen dem Schwefelgehalt von Pflanzen und dem Schwefeldioxidgehalt der Luft). Text in German. Z. Pflanzenkrankh. Pflanzenschultz, 77(4/5):200-220, April-May 1970. 80 refs.

Field experiments conducted with monocotyledons, diocotyledons, and conifers in the vicinity of a sulfur dioxide source and gasification experiments conducted in the laboratory to determine the correlation between SO2 emission (concentration and exposure time) and plant sulfur content disclosed that while the absorption of SO2 at high concentrations was relatively small, sulfur accumulation in plants increased with decreasing SO2 concentration and with increasing exposure time. The old assumption that sulfur content in plants was an indication of only chronic SO2 emissions but not of acutely damaging SO2 concentrations was disproved. Under practical conditions, high concentrations do not occur by themselves but always together with low concentrations. In uniform plant material, sulfur accumulation determined by chemical plant analysis is a reliable indicator of SO2 emission levels at which deleterious effects on yield or quality are no longer discernible. In discontinuous exposure to SO2, sulfur accumulation first increases with the number of exposures and their duration and then levels off. Photosynthetic measurements disclosed that the recovery during emission-free periods affected SO2 absorption.

24533

Buck, M.

EXPERIMENTS ON THE EFFECT OF AIR POLLUTION ON PLANTS. (Untersuchuchungen ueber die Wirkung von Luftverunreinigungen auf Pflanzen). Air Pollution Proc. First European Congr. Influence Air Pollution Plants Animals Wageningen, Netherlands, 1968, p. 53-73. 17 refs. Translated from German. Belov and Associates, Denver, Colo., 28p., Sept. 15, 1970.

The use of indicator plants for detecting air pollutants and their range of distribution is gaining ground as a supplement to physical and chemical analyses of air. Plant reactions considered to constitute proof of pollution include the amount of pollutant accumulated and visible symptoms such as necrosis or the presence of certain kinds of lichen. It also seems likely that products produced by metabolic responses of a plant to absorbed pollutants are useful indicators. Combining these indicators with the specific sensitivity of individual plants or species could lead to manifold possibilities. Trials in progress involve the use of indicator chambers, which have an advantage over field indicators in that no damaging substances are absorbed through soil. Using combinations of indicator plants should permit identification of pollutants responsible for damage, even when several pollutants are simultaneously present, as in most industrial areas. A list is included of indicator plants suitable for sulfur dioxide, hydrogen fluoride, gaseous and stable inorganic fluoride compounds, and ozone.

24714

Cormis, L. du

SOME ASPECTS OF SULPHUR ABSORPTION BY PLANTS SUBJECTED TO AN ATMOSPHERE CONTAINING SO2. (Quelques aspects de l'absorption du soufre par les plants soumises a une atmosphere contenant du SO2). Air Pollution Proc. First European Congr. Influence Air Pollution Plants Animals, Wageningen, Netherlands, 1968, p. 75-78. Translated from French. Belov and Associates, Denver, Colo., 5p., Sept. 3, 1970.

Tomato plants the roots of which were treated with radioactive sulfur dioxide absorbed sulfur in quantities that decreased rapidly to stabilize around the fourth day following fumigation. When the same plants were cultivated on liquid matter, radioactive sulfur was found in the roots and in the liquid matter of the culture. This is indicative of elimination by the roots. Immediately after treatment, 98% of the absorbed sulfur was in the form of sulfates. At the end of 15 days, 92.5% was in the form of sulfates, 2.5% in the form of sulfurated amino acids, and 5% in the form of sulfurated proteins. These results show that SO2 is metabolized by plants and excludes the hypothesis of plant poisoning by cumulative SO2 action. Tomatoes and other plants growing in a SO2 atmosphere also gave off hydrogen sulfide. The discharge came mainly from atmospheric SO2 but partly from sulfur in the plant. Unlike the absorption of SO2, the release of H2S depended on light. The absence of damages when pollution by SO2 occurs in the dark and the discharge of H2S only when plants are illuminated open new possibilities for studying the metabolism of sulfur in relation to atmospheric pollution by SO2.

24773

Richter, Oswald

PLANT GROWTH AND LABORATORY ATMOSPHERE. (Pflanzenwachstum und laboratoriumsluft). Ber. Deut. Botan. Ges., vol. 21:180-194, 1903. 35 refs. Translated from German. Belov and Associates, Denver, Colo., 29p., June 10, 1970.

A series of experiments designed to determine the effect of reduced oxygen or increased carbon monoxide on plant growth is described. The results of the experiments indicate that gaseous impurities in the atmosphere may have significant effects on the rate of plant growth. Another series of experiments is conducted to determine the specific effects of coal gas, particularly acetylene and ethylene, on the growth of certain vegetables. The results indicate that coal gas has an inhibiting effect on the growth in length and that it promotes the growth in thickness. A simple gas absorption system utilizing charcoal decreases the influence of coal gas. The shortening and thickening of affected plants is proportional to the amount of coal gas and to the duration of exposure. The effects of reduced oxygen partial pressure and plant respiration on plant growth include nutations of 130-270 deg. Mercury vapor can produce similar differences in growth as coal gas, however, it kills the plants within a short time.

24787

Navara, J.

SOME DATA ON THE WATER BALANCE IN PLANTS IN THE PRESENCE OF FLUOR IN THE SUBSTRATE. (Beitrag sur Kenntnis der Wasserhaushalt der Pflanzen bei Anwesenheit des Fluors im Substrat). Air Pollution Proc. First European Congr. Influence Air Pollution Plants Animals, Wageningen, Netherlands, 1968, p. 91-97. Translated from German. Belov and Associates, Denver, Colo., 7p., Oct. 28, 1970.

Studies were conducted of the water balance of the Senator variety of Pisum sativum in the presence of fluor (in the form of sodium fluoride) in the substrate. The effect of fluor was seen in a withering of those portions of the plant above the soil. The unfavorable hydration condition observed is the result of changes in the amount of water assimilated and the amount given off. The presence of fluor first stimulated and then reduced the amount of water given off. No preliminary increase was noted before the amount of water taken in was reduced, and plants assimilated no water after 68 hrs in the presence of 0.29 and 0.25 g/l F. A balance between the amount of water taken in and given off was reached only after approximately 27 hrs at a level of approximately 40% of the original transpiration and approximately 90% of the original water content of the plant.

24788

Kloke, A. and H. O. Leh

POLLUTION OF CULTIVATED PLANTS WITH LEAD FROM AUTO EXHAUST. (Verunreinigungen von Kulturpflanzen mit Blei aus Kraftfahrzeugabgasen). Air Pollution Proc. First European Congr. Influence Air Pollution Plants Animals, Wageningen, Netherlands, 1968, p. 259-268. Translated from German. Belov and Associates, Denver, Colo., 15p., Nov. 2, 1970.

Plant samples from areas adjacent to and remote from dense traffic were analyzed for lead. The lead content of the green parts of plants increased with increasing closeness to well-travelled highways and streets. Even in the vicinity of highways, no increase was noted in lead concentrations in below-ground and inner portions of plants. The lead content of feed plants growing along roads was far in excess of the suggested tolerable concentration of 10 ppm. For the protection of humans and cattle, cultivation of food and forage plants along roadways should be abandoned or the use of tetraethyl lead in fuel prohibited.

24848

Cormis, L. de

CONTRIBUTIONS TO THE STUDY OF THE ABSORPTION OF SULPHUR BY PLANTS WHEN SUBMITTED TO AN ATMOSPHERE OF SULPHUR DIOXIDE. (Contributio a l'etude de l'absorption de soufre par les plantes soumises a une atmosphere contenant du dioxyde de soufre). APCA (Air Pollution Control Assoc.) Abstr., 15(11):195-202, April 1970. 7 refs. (Also: Ann Physiol. Vegetale, 10(2):99-112, 1968.) Translated from French. Belov and Associates, Denver, Colo., 18p., Sept. 4, 1970.

Tomato plants grown in an atmosphere containing sulfur dioxide absorbed is in an amount proportional to that present in the atmosphere. The absorption was rapid and accompanied by a release of hydrogen sulfide. The absorbed SO2 'migrated' to different parts of the plants; some of it apparently was eliminated through the roots. This can be regarded as proof of the noncumulative toxicity of atmospheric sulfur. Much of the sulfur absorbed was metabolized by the plants in the form of sulfates, amino acids, and sulfur proteins. The SO2 was of atmospheric origin, and both its absorption and the discharge of H2S were related to the presence of light and thus to the photosynthesis of the treated plant. (Author conclusions modified)

24850

Coupe, M.

ON THE INTERCELLULAR NITRATE IN THE LEAVES AND ROOTS OF BARLEY. (Sur la localisation intracellulaire de la nitrate reductase dans les feuilles et les racines d'orge). Physiol Veg., 5(3):271-291, 1967. 15 refs. Translated from French. Belov and Associates, Denver, Colo., 30p., Sept. 3, 1970.

An estimate is made of the relative importance of the reduction of nitrate in the chloroplasts in the mitochondria and the cytoplasm of barley leaves. Because of varying results with different methods of preparation of the cell organites, two techniques are used. The first involves immersion in an aqueous medium, from which it is possible to obtain a fraction which is rich in granules whose outer membranes are intact. The second method, using lyophilised leaves with centrifugation according to density, yields chloroplasts which retain their enzymes and other hydrosoluble factors, although various liposoluble factors can be lost. In chloroplasts obtained by the first method, the activity of nitrate reductase is very weak. The second method permits calculations that indicate these organites contain about 60% of the activity present in the leaf. The nuclear and mitochondrial fractions and the roots contain little nitrate reductase. Cytoplasm is always abundant in this enzyme. The addition of molybdenum to the aqueous types does not increase their activity. (Author summary modified)

24851

Dorries, Wilhelm

ORIGINAL TREATISES CONCERNING THE USABILITY OF THE SPECTROSCOPIC PHAOPHYTIN-TEST IN SMOKE-DAMAGE DIAGNOSIS. Prussian Inst. for th Hygiene of Water, Soil and Air, Berlin-Dahlem (Germany), Dept. of Biology, p. 258-273, 1932. Translated from German. 18p.

Because of the unreliability of chemical methods for determining whether acid smoke gases have damaged chlorophyll-containing plant tissues, numerous investigations were conducted to determine the practicability of the spectroscopic pheophytin test. Specific goals of the experiments were to test if pheophytin can be created by experimental exposure to gas, if pheophytin is created by damages in open spaces containing no source other than acid smoke gas, and if leaf staining and color changes can exist where damages have not been caused by acid smoke gas. As determined by several hundred samples, the effect of acid smoke gases can, once the 'characteristic' leaf stains occur, be identified as 'smoke damages' by the spectroscopic pheophytin test. However, the method fails when chlorophyll-carrying cells have been damaged by very weak concentrations of sulfurous acid to the extent that full bleaching of the chlorophyll coloring occurs. It is also important to distinguish acid damage from symptoms of water shortage, sunburn, so-called frost drying and from typical autumn coloring.

24852

Cormis, L. De

COMPARISON OF THE EFFECTS OF SULPHUR DIOXIDE AND OF THE DERIVATIVES OF FLUORINE ON A FEW PLANTS. (Action Compare de l'anhydride sulfureux et des derives fluores sur quelques vegetaux). Proc. Intern. Clean Air Cong., London, 1966 (Part I), 6(5):171-173. Translated from French. Belov and Associates, Denver, Colo., 9p., Sept. 9, 1970.

The frequent absence of a correlation between plant damage and air pollution in the vicinity of a plant emitting 400 tons per day sulfur dioxide and 150 kg per day fluorine led to studied of the nature of the absorption of both pollutants in plants. Both fluorine and sulfur dioxide are absorbed by leaves of tomato plants in proportion to the amount applied. However, absorbed sulfur migrates within the plants and is distributed as the sulfur normally found in plants. Fluorine is accumulated by the leaves, resulting in eventual necrosis beyond a certain limit; these limits have to be separately defined for each species of vegetation. Because sulfur is metabolized in part by the plant, it cannot have a cumulative toxic effect when applied in subtoxic quantities.

24933

Bossavy, J.

INFORMATION ON DAMAGE CAUSED BY AIR POLLUTION TO THE PLANTS AND ANIMALS IN EUROPEAN COUNTRIES. (Informations sur les dommages causes par la pollution de l'air aux plantes et aux animaux dans les pays europeens). Air Pollution Proc. 1st European Congr. on the Influence of Air Pollution on Plants and Animals, Wageningen, The Netherlands, 1968, p. 15-26. Translated from French. Belov and Associates, Denver, Colo., Sept. 3, 1970.

All specialists agree that sulfur dioxide and fluorine compounds are particularly important plant toxins. Picea abies, Abies alba, and Pinus sylvestris, by far the most important trees cultivated in Central Europe, are highly susceptible to these two pollutants. The damage caused by them reaches alarming proportions, endangering the existence of forests in many areas. The total area of damaged forests probably approaches 400,000 hectares. Damages to land under cultivation are less spectacular because growing conditions can be artificially improved. Pollution effects are often limited to the yield or partial loss of quality for one growing season. The influence of fluorine on animal teeth and bones is well known: the effects can be partly averted by adding correct amounts of phosphate and calcium to animal rations or by supplying feed containing sufficient minerals. In general, research on the effect of pollutants on vegetation is directed toward the absorption of pollutants, their transport in leaf parenchyma, and their effects on physiological processes. Creation of new species or varieties of domestic plants capable of supporting high pollution levels seems possible. (Author abstract modified)

25307

Schoenbeck, Helfried

EFFECT OF AIR POLLUTION (SO2) ON TRANSPLANTED LICHENS. (Einfluss von Luftverunreinigungen (SO2) auf transplantierte Flechten). Text in German. Naturwissenschaften (Berlin), 55(9):451-452, Sept. 1968. 6 refs.

In order to cast light on the sensitivity of the epiphytic lichens to urban influences, an experiment was conducted in a forested area near the iron ore roasting plant at Biersdorf, in the valley of the Sieg River. More specifically, it was a measurement of the effect of sulfur dioxide on Parmelia physodes. The lichens had been transplanted from their original place of origin to similar ecological conditions, provided by the tree host, Quercus robur. The SO2 content of the air was intermittently monitored, and an average taken of the measured values. At points where the average SO2 concentrations were highest, the lichens died out completely in 29 days. Even at points of low SO2 concentration, the surface of the thallus was 40% damaged 68 days after the beginning of the experiment. At that point, the plant was shut down, and lichens transplanted after this date were not so affected. Experiments in a controlled environment with simulated outdoor conditions gave similar results with this species of lichen. This life form would seem to be a good indicator for use in air analysis experiments.

25330

Bredemann, G. and H. Radeloff

FLUE-GAS DAMAGE BY WASTE GASES CONTAINING SULFUROUS ACID AND ITS IDENTIFICATION. (Rauchschaden durch schwefligsaure Abgase und ihre Erkennung). Phyopathol. Z., 4(2):13, 180-194, 1933 (?). 33 refs. Translated from German. Belov and Associates, Denver, Colo., 28p., June 18, 1970.

Most methods for identifying plant damage due to sulfur dioxide in flue gases are not sufficiently specific for SO2. In contrast, identification of sulfite ions in leaves is unambiguous proof of the presence of SO2-containing gases because sulfites do not occur in normal leaves that are not exposed to SO2 vapors. Identificatio of the sulfites can be made by a number of qualitative or quantitative methods, such as the blue coloration of starch in a solution of potassium iodate, attachment to formaldehyde with titration of the OH ion thus formed, distillation in iodine solution and titration with thiosulfate, and distillation in iodine solution and precipitation as barium sulfate. Good results were obtained with precipitation of barium sulfate after a preceding oxidation with bromine vapors or hydrogen peroxide. As determined by an investigation of numerous plant samples, the amount of precipitation generally parallels the degree of damage. Among plants growing near a slag burning dump, those nearest the dump had strongly discolored leaves. The SO2 which these plants had taken up resulted in considerable precipitation with the formation of crystals. With increasing distance from the dump, the precipitation decreased and became predominantly amorphous.

25660

Pesek, F.

BIOCHEMICAL PHENOMENA IN THE SOIL IN EXHALATION AREAS. (Biochemische Phenomane in Boden Exhalationsgebiete.) Air Pollution Proc., First European Congr. Influence Air Pollution Plants Animals Wageningen, 1968, p. 33-39. 24 refs. Translated from German. Belov and Associates, Denver, Colo., 7p., Nov. 3, 1970.

To study the problems connected with soil poisoning, it is necessary to know the concentration of substances emitted from the suspected industrial sources and the amount of exposure time. Chemicals which were found in quantities between 0.01 and 1.9% in diseased soil in the region of Bohemia are presented tabularly. Toxicity limits and physiological thresholds are necessary to provide a prognosis and therapy in emission areas. An equation is provided indicating the sterility of the soil toward vegetation.

25661

Rippel, A. and J. Janovicova

THE INFLUENCE OF FLUORINE EXHALATION ON THE FLORA IN THE SURROUNDINGS OF AN ALUMINUM PLANT. (Der Einfluss von Fluorexhalaten auf die Pflanzenwelt in der Umgebung eines Aluminumwerkes. Air Pollution Proc., First European Congr. Influence Air Pollution Plants Animals, Wageningen, 1968, p. 173- 178. Translated from German. Belov and Associates, Denver, Colo., 5p., Nov. 3, 1970.

Examinations of the forest vegetation and agricultural life in the surroundings of an aluminum plant over a period of six years revealed intoxication and injuries to the vegetation by fluorine compounds. The degree of injury differed in correlation with the distance from the plant and the prevailing wind direction. Further studies revealed that plums were a more sensitive indicator to fluorine pollution than apples, pears, cherries, and grapes. Among vegetables the most striking differences were noted with leaf vegetables such as lettuce and cabbage. Wheat showed higher fluorine contents than rye. (Author summary modified)

25665

Balazova, G. and E. Hluchan

THE EFFECT OF FLUORINE EXHALATION ON ANIMALS IN THE SURROUNDINGS OF AN ALUMINUM PLANT. (Der Einfluss von Fluorexhalaten auf die Tiere in der Umgebung einer Aluminiumfabrik). Air Pollution Proc., First European Congr. Influence Air Pollution Plants Animals. Wageningen, 1968, p. 275-279. Translated from German. Belov and Associates, Denver, Colo., 5p., Nov. 3, 1970.

In the vicinity of an aluminum plant, the presence of fluor was examined in the air as well as in the organs of house sparrows and pigeons. The fluor in milk and eggs produced in the immediate vicinity was simultaneously determined. To a various extent and in the majority of samples, a significant increase of fluor contents was observed. The first evidence of damaging results was fluorosis in the cattle. (Author summary modified)

26175

Pollanschuetz, J.

OBSERVATIONS ABOUT THE SUSCEPTIBILITY OF VARIOUS KINDS OF TREES WITH RESPECT TO EMISSION OF SO2, HF, AND MAGNESITE DUST. (Beobachtungen ueber die Empfindkichkeit vershiedener Baumarten gengenueber Immissionen von SO2, Hf and Magnesitstaub). Air Pollution Proc. First European Congr. Influence Air Pollution Plants and Animals, Wageningen, Netherlands 1968. p. 371-377. Translated from German. Belov and Associates., Denver, Colo., 10p., Oct. 13, 1970.

Investigations were conducted to determine the degree of growth inhibition in various forest trees exposed to hydrogen fluoride emissions alone or to simultaneous emissions either of hydrogen fluoride and sulfur dioxide or sulfur dioxide and magnesite dust. Trees susceptible to SO2, and Mg are, in increasing order of susceptibility, larch, pine, spruce, fir, and beech. Trees susceptible to SO2 and HF are in increasing order of susceptibility, aspen, ash, beech, maple, spruce, pine, and larch. Susceptibility to HF increases in the order pine, spruce, fir. Unlike spruce trees, pines show no noteworthy individual differences in resistance to air contaminants. Resistance in spruce is affected by factors such as location and water and nutrient supply. The need to develop resistant strains of spruce is indicated by the importance of the tree for the European forest economy.

26367

Stratmann, H., M. Buck, and B. Prinz

CRITERIA FOR THE LIMITING OF POLLUTION AND THEIR SIGNIFICANCE. (Masstaebe fuer die Begrenzung der Luftverunreinigung und ihre Bedeutung). Text in German. Landesanstalt fuer Immissins- und Bodennutzungsschutz des Landes Nordrhein-Westfalen, Essen (West Germany), Rept. 12, p. 62-80, 1968. 35 refs.

The direct and indirect effects of pollution on humans, animals, plants, and inanimate objects are identified and the two ways of limiting pollution by lowering the emission or ambient concentation level are analyzed. Pollution manifests itself differently on various object groups. The choice of criteria, the relationship between ambient concentration and its effect, the difference between damage and impairment (exemplified on plants) and statistical procedures which should govern the application of criteria of ambient concentration and of its effects are discussed. Ambient concentration limits can be set only for a single clearly defined component (SO2, NO2 for example), effects of combinations of pollutants can be measured only on biological objects. Only a single ambient concentration limit can be set for all object groups. The quantification of the relationship between ambient concentration and action criteria will of necessity be inexact. In the determination of ambient concentration limits both human and freedom of enterprise must be considered among other factors in order to arrive at the right balance.

26491

Hajduk, T.

CHANGES OF PLANT CULTURES ON AREAS IN REGION OF THE INFLUENCE OF FLUORINE EMISSIONS. (Zmeny fytocenoz natrvalych plochach voblast posobenia fluorovych exhalatov). Text in Czech. Ochrana Ovsdusi, vol. 11-12:177-181, 1969. 12 refs.

The results of a study of qualitative and quantitative changes of plant cultures in the area of fluorine emissions from an aluminum plant are presented. Emissions considered included hydrogen fluoride, carbon tetrafluoride, and solid fluorides as well as carbon monoxide, sulfur dioxide, and similar toxic compounds. The circular experimental surface areas (r equals 2.5m) placed at 100-200 m intervals in 3 directions from the emission source were regularly investigated. As criteria of change sociability coverage, coefficient of relationship, and domination were used. The number of plant species changed in an irregular fashion with the distance from the emission source and with length of exposure to emissions with the exception of a route going through an even flat terrain. The coefficient of relationship behaved in a similar manner. The total coverage decreased towards the epicentrum and with the length of exposure to emissions. An exception was trifolium rubens, which is a species resistant to fluorine emissions. The frequency and coverage of certain species of the Daucaceae and Asteraceae family also increased. Qualitative changes of plant cultures on varying terrain thus occur irregularly, while on even terrain they bear a certain relation to the distance from the emission source. The changes so far observed were of a quantitatitve nature. Within a few years, extensive qualitative changes are expected in the area with deposits higher than 500 kgf/square km per year.

27388

Faller, N., K. Herwig, and H. Kuhn

ASSIMILATION OF SULFUR DIOXIDE (S3502) FROM THE AIR. I. INFLUENCE ON THE PLANT YIELD. (Die aufnahme von Schwefeldioxyd (S3502) aus der Luft. I. Einfluss auf den Pflanzlichen ertrag). Plant Soil, vol. 33:177-191, 1970. 2 refs. Translated from German. APTIC Tr. 1089.

Sunflower, corn, tobacco, and radish plants were exposed to 0-1.5 mg sulfur dioxide/cu m air for 9-20 days in special vegetation chambers. Corn and sunflower reacted with 0.5 or 1.0 mg SO2/cu m air to give an optimal yield, and a rise in yield was established for radish and tobacco up to 1.0 or 1.5 mg SO2/cu m air. Under the experimental conditions, the SO2 assimilated from the air represented the predominant source of sulfur which, in general, makes possible normal plant growth. The results demonstrate that the sulfur supply from the air is of special importance for plants with insufficient nutrition in contact with plant roots. (Author summary modified)

27827

Stefan, K.

THE INFLUENCE OF FERTILIZATION ON THE TOTAL SULFUR CONTENT OF SPRUCE(FIR) NEEDLES. (Die Beinflussung des Gesamtschwefelgehaltes von Fichtennadeln durch Dungung). Air Pollution Proc., First European Congr. Influence Air Pollution Plants Animals, Wageningen, Netherlands, 1968. 1 ref. Translated from German. Data Methods Corp., Denver, Colo., 4p., Oct. 9, 1970.

An experimental program designed to determine the effect of fertilization on the sulfur content of spruce needles is described. Needles taken from trees damaged by sulfur dioxide were analyzed to determine the characteristics of the sulfur content. The natural sulfur content of needles and its variation were determined before the fertilization process was begun. Fertilizers of two types, nitrogenous and sulfurous, were applied to controlled groups of trees. The change in sulfur content of the needles as a result of the sulfurous fertilizer was determined. The overall effect of the fertilization was a decrease in sulfur content of all the treated trees. However, the results were diverse and it is likely that they were influenced by location. The analytical method used to determine the sulfur content of the needless is described.

27925

Halbwachs, G.

FOR THE CLARIFICATION OF TAR VAPOR DAMAGE TO PLANTS. (Zur Aufklarung der Schadigungen von Pflanzen durch Teerdampfe.) Air Pollution Proc. First European Congr. Influence Air Pollution Plants Animals, Wageningen, Netherlands, 1969, p. 167-172. Translated from German. Data Methods Corp., Denver, Colo., 6p., Oct. 12, 1970.

To answer the question which compounds of tar vapors damage plants, and especially potatoes, several of the pure components of tar were tested. Since only vapors evolving between 100 and 300 C cause injuries, the experiments were restricted to acenapthene, acridine, anthracene, carbazole, chrysene, fluoranthene, fluorene, napthalene and phenanthrene. Because evaporation of solvents results in small crystals on the epidermis, these substances were mixed with glycerine forming very small droplets on the surface of the leaves. Injuries occurred only with acridine, anthracene and fluoranthene, but solely when the plants were put in direct sunlight after the fumigation. These three compounds have a very similar chemical constitution in showing a condensed three ring system in one plane. Other acene and anthracene derivatives such as phenazine, xanthene, 2-methyl-anthracene, 9-methylanthracene and 9-10-dihydroanthracene, were also examined. During microscopic observation of the droplets, it was found that droplet changes in regard to a fluorescent reaction resulted under the influence of ultraviolet light. (Author summary)

28409

Navara, Jan

A CONTRIBUTION CONCERNING EFFECT OF FLUORINE ON SEED GERMINATION IN RELATION TO THE NATURAL CONTENT OF ASH AND SOME BIOGENIC ENDS. (Prispevok k ucinku fluoru na knicenie semien vo vztahu k prirodzenemu obsahu populovin a niektorych biogennych prvkov). Biologia, 19(8):589-596, 1964. 9 refs. Translated from Russian. Belov and Associates, Denver, Colo., 11p., Jan. 2, 1971.

The effects of low and high concentrations of fluorine on the germination of seeds of peas, barley, white mustard, kohlrabi, and carrots were studied in relationship to the mineral content of the seeds. Fluorine was applied by soaking seeds for 20 hrs in various concentrations of sodium fluoride. High concentrations of fluorine inhibited germination of pea and barley seeds and, to a lesser extent, mustard and kohlrabi seeds. Seeds of poppies and carrots were relatively unaffected. For the most part low concentrations of fluorine had a stimulating effect that was apparent in speed of germination and overall ability to germinate, as well as root growth and the growth of coleoptiles. Increasing the calcium content of seeds by the application of Ca(NO3)2 decreased the inhibiting effects of fluorine on the germination process. The levels of other mineral elements in seeds appeared to have no correlation with tolerance to fluorine.

28475

Bovay, Ernest

THE EFFECTS OF AIR POLLUTION ON PLANTS. (Effets de la pollution de l'air sur les plantes). Text in French. In: Probleme der Luftverunreinigung durch die Industrie. Switzerland, Vogt-Schild S. A., 1969, p. 1-19. 126 refs.

A review is presented of sources of SO2, methods of measuring it in the atmosphere, maximal permissible SO2 levels, its mode of action on plant tissues, contributory factors, sensitivity of species and plant organs and methods of evaluating damage caused by SO2, including inspection, air analysis, analysis of the affected tissues, microscopic examination, and turbidimetric tests. Some of the same subjects are also discussed for fluorine emissions. Damage from these and other pollutants, including chlorine, hydrochloric acid, ammonia, hydrogen sulfide, zinc oxide dust, dust from cement plants, compounds of arsenic and molybdene, coal tar fumes, automobile emissions, ozone, peroxyacetyl nitrate, and smog, to a variety of plants is described.

28597

Taniyama, Tetsuro and Hiroki Arikado

STUDIES ON THE MECHANISM OF TOXIC GAS INJURY TO CROP PLANTS. II. THE RELATIONSHIP BETWEEN SULFUR DIOXIDE AND LIGHT IN INJURY TO BARLEY AND RAPE. (Sakumotsu no gasu shogai ni kansuru kenkyu. I Hikari no umu to natane oyobi hadaka-mugi no aryusan gasu shogai tono kankei). Nippon Sakumotsu Gakkai Kiji (Proc. Crop Sci. Soc. Japan), vol. 37:608-613, 1968. 7 refs. Translated from Japanese. 10p.

The injurious effects of sulfur dioxide on crop plants was studied under a light intensity of 20 k lux and in the dark. The plants were exposed to 20 ppm SO2. The injury observed on the leaves of both rape and barley, even under the dark condition, increased in degree as the exposure time was extended. Rape, in the flowering stage, showed no significant difference in susceptibility to the gas whether the plants were in the dark or light; in the vegetative stage, the plant was more severely injured in the dark than in the light. Barley, however, was more severely injured in the light tha in the dark. The leaves of both plants absorbed sulfur whether in the light or dark. Particularly with rape, the sulfur content of thy leaves increased linearly with longer treatment time, showing a higher sulfur content in the light than in the dark. The degree of injury appearing on the leaves correlated positively with the sulfur content of the leaves, but in rape the considerably high sulfur content did not cause any visible injuries to the leaves. (Author summary modified)

28600

Cormis, L. de

ABSORPTION OF FLUORINE SOLUTIONS AND MIGRATION OF FLUORINE IN THE TOMATO. Ann. Physiol. Veg., 10(3):155-169, 1968. 20 refs. Translated from French. 28p.

Studies were made to determine whether fluorine absorbed by the leaves of tomato plants can be displaced toward the roots and whether the fluorine contained in the soil can be absorbed by the roots and then displaced toward the leaves. In the first part of the study, fluorine was introduced to the aerial parts of tomato plants, either by soaking the leaves or the leaf stalks with a hydrofluoric acid solution of 4 g/l of fluorine in two tests, the first lasting 2 minutes, the second, 4 minutes. The soaked leaves were rinsed twice in distilled water and their fluorine contents were measured and proved to be, respectively, 319 and 409 ppm, indicating that absorption of the fluorine ion is rapid. In the second part of the experiment, tomato plants were grown in various cultivation environments to which fluorine solutions were added. Tabulated data for both parts of the experiment revealed that fluorine moves normally from the leaf stalk of absorption to the leaflets, the stems serve essentially as a passage area, an appreciable quantity of fluorine is still found in the stem at the time of collection, there is practically no passage of fluorine to the roots, and that if the cultivation environment contains a large quantity of fluorine, the latter is not noticeably displaced toward the leaves even if it is absorbed in small parts of the roots.

28680

Taniyama, Tetsuro and Hiroki Arikado

STUDIES ON THE MECHANISM OF TOXIC GAS INJURY TO CROP PLANTS. V. EFFECTS OF SULFUR DIOXIDE ON THE PHOTOSYNTHESIS OF RICE PLANTS. (Sakumotsu no gasu shogai ni kansuru kenkyu. V. Shito no tansandoka-sayo ni oyobosu aryusan gasu no eikyo). Nippon Sakumotsu Gakkai Kiji (Proc. Crop Sci. Soc. Japan), 38(4):592-602, 1969. 10 refs. Translated from Japanese, 14p.

The injurious effects of sulfur dioxide on photosynthesis and absorption of sulfur into leaves of rice plants were studied. It is shown that both visible actual photosynthesis are depressed by fumigation with sulfur dioxide. Visible photosynthesis was completely inhibited one hour after the plant was exposed to the gas, after being treated continuously at high concentrations such as 20 and 40 ppm. At concentrations of 6, 10, and 40 ppm, the depression of visible photosynthesis caused by fumigating with sulfur dioxide for one hour, was restored to the original state two hours after the gas was removed, but was not restored after fumigations at concentrations of 30 and 70 ppm. When rice plants were fumigated with sulfur dioxide at concentrations up to 20 ppm, the sulfur content in the leaves increased significantly with only a slight increase as the concentrations became higher. The content of sulfur absorbed in the leaves did increase, however, in proportion to the length of the fumigation period. (Author summary modified)

29147

Byrne, A. R. and L. Kosta

STUDIES ON THE DISTRIBUTION AND UPTAKE OF MERCURY IN THE AREA OF THE MERCURY MINE AT IDRIJA, SLOVENIA (YUGOSLAVIA). Vestn. Sloven. Kem. Drustva, 17(1/4):5-11, 1970. 5 refs.

Results are presented of a preliminary investigation of the mercury content of environmental samples, primarily of various water, soil, and plant samples, in the neighborhood of the mercury mine at Idrija, Yugoslavia. The measurement technique was activation analysis using a volatilization method for mercury separation. Results show a wide range from apparently normal background (0.005-0.1 ppm) to very high levels (10-100 ppm). The highest values are mainly due to aerial contamination from the mine flue gases. More importantly, the results show the ability of vegetation to accumulate mercury during growth. (Author abstract)

29254

Bertitz, Siegfried and Michael Vogl

ON THE TRANSPIRATION OF CONIFER NEEDLES WITH DIFFERING EXPOSURES TO SO2. (Zur Transpiration von Koniferennadeln bei Untersohiedlicher SO2 Einwirkung). Arch. Forstwes, vol. 11:663-? 1967. 3 refs. Translated from German.

Gassing of conifer needles from smoke-damaged trees with high sulfur dioxide concentrations (10-200 ppm) produced a decrease in assimilation and an increase in transpiration that was followed by a subsequent decrease as cell destruction in assimilation organs progressed. Gassing with low SO2 concentrations produced two completely different reactions. In one case, a clear decrease in assimilation was observed following exposure of needles to 1.7 ppm SO2, but further gassing with a carbon dioxide balance was required to increase transpiration. In another case, 0.85 ppm SO2 produced a simultaneous lessening of assimilation and transpiration. In field measurements, a decrease in transpiration was observed only where a decline in assimilation was already apparent. These results are compared with earlier, contradictory studies.

29671

Matsushima, Jiro

ON COMPOSITE HARM TO PLANTS BY SULFUROUS ACID GAS AND OXIDANT. (Shokubutsu ni taisuru aryusangasu to okishidanto no fukugogai ni tsuite). Text in Japanese. Sangyo Kogai (Ind. Public Nuisance), 7(5):218-224, May 1971.

The composite effects on plants of sulfur dioxide and ozone, SO2 and PAN (peroxyacetyl nitrate) SO2, and nitrogen dioxide, and NO2 and ozone were studied. Pinto bean plants were exposed to SO2 or O3 only, to each gas alternately, and to a mixture of the two. The degree of injury by the gas or gases was indicated in percentage by area of the leaves damaged. In cases where no geometric effect occurred the damage to the plant by the individual gas had been great; damage from the individual gas had been slight in those case where such an effect was observed. The geometric effect is produced when the density of SO2 is rather low, generally 0.05-0.25 ppm. A mixture of SO2 and O3 was applied to a tobacco plant; it affected fully grown leaves as reported by Menser. In experiments on the composite effects of SO2 and PAN on bean, tomato, and pepper plants, PAN affected mainly young leaves while SO2 affected mature ones. These effects were arithmetic rather than geometric. The SO2 and NO2 were also studied in the same manner. When SO2 and NO2 were mixed, a geometric effect was conspicuous in damage to vegetables, the symptoms of damage by either of the two appeared about the same, younger leaves being affected less. When treated with the two gases alternately, the damage was greater if the plants were first treated with NO2; possible causes for this effect are discussed. No significant composite effect of NO2 and O3 was observed.

30003

Keller, Theodor

THE EFFECTS OF AIR POLLUTION ON VEGETATION. (Auswirkungen der Luftverunreinigungen auf die Vegetation). Text in German. Staedtehygiene (Uelzen/Hamburg), 22(6):130-136, 1971. 16 refs.

Generally two groups of air pollutants are distinguished when considering vegetation effects. Inert dusts can be taken by plants without injury; toxic gases, however, destroy them. Of all forms of vegetation the forest has the highest dust filtering capacity: one hectare of spruce forest binds about 32 tons of dust; 1 hectare of beech forest, 68 tons when the dust is washed off by rain, the filtering capacity is restored and the dust is mixed with the soil. Of the gases, sulfur dioxide is the most harmful. It is estimated that about 200,000 hectares of forest have been damaged in the German Democratic Republic by emission of SO2. The long-term maximum allowable emission concentration for SO2 in Switzerland is 0.2 ppm, which still seems to be too high. The SO2 which penetrates into the cells attacks the chlorophyll and causes chlorosis. It has been found that deciduous trees are much more resistant than coniferous ones. Through adequate fertilization the resistance of plants may be increased; through nitrogen fertilization growth is stimulated and injuries can be healed faster. However, through the higher assimilation, more pollutants may penetrate the plant organs. Further studies are needed to determine which one of these processes prevails.

30469

Spaeth and Meyer

OBSERVATIONS OF THE EFFECT OF COAL GAS ON THE VEGETATION OF TREES. (Beobachtungen uber den Einfluss des Leuchtgases auf die Vegetation von Baumen). Landwirt., Ver. Sta., 1872(16):336-341. Translated from German. Belov and Associates, Denver, Colo., 8p., May 12, 1970.

Investigations on the effects of coal gas on the growth of trees are discussed. The trees were distributed over an area of 28.28 sq m; 1.545 and 0.772 cu m of coal gas were introduced to the soil daily. After four weeks of gas treatment, the buds of trees which were certain to die had a seemingly healthy appearance. However, a closer examination of the cross sections showed the buds of the plane trees, silver poplar, American walnut, tree of heaven, and acacia were completely dead. The buds of the maple trees and the horse chestnuts were still alive but had a brown discoloration on the inside. Only the buds of the linden trees still seemed normal. However, they did not sprout in the spring. A closer examination revealed that all roots, with the exception of a few strong main roots, were dead. A large quantity of coal gas, introduced to the roots while in a state of hibernation was much less harmful than a much smaller amount introduced during their growing period. Some species (tree of heaven, locust, elm, and acacia) showed signs of poisoning sooner, some (maple and linden) later.

30709

Taniyama, Tetsuro and Hiroki Arikado

STUDIES ON THE MECHANISM OF TOXIC GAS INJURY TO CROP PLANTS. 1. THE RELATIONSHIP OF SULFUR DIOXIDE CONCENTRATION TO THE EXTENT OF LEAF INJURY IN SEVERAL CROPS. (Sakumotsu no gasu shogai ni kansuru kenkyu. 1. Su-shu sakumotsu no aryusan gasu nodo to yomen hakai teido tono kankei). Nippon Sakumotsu Gakkai Kiji (Proc. Crop Sci. Soc. Japan), vol. 37:366-371, 1968. 10 refs. Translated from Japanese, 12p.

Paddy rice, barley, tobacco, orchard grass, and alsike clover were treated for two hrs/day for seven days with sulfur dioxide concentrations of 1, 5, 10, 15, and 20 ppm. Treatment was carried out in an exposure chamber at 25,C, 20 klux light intensity, and under 76-90% humidity variation. The experiment did not demonstrate any correlation between percentage of leaf injury and increase SO2 concentration, nor established whether the percentage of leaf injury is related to temperature and light intensity. Injury rates at the vegetative stage decreased in the following order: alsike clover, orchard grass, barley, tobacco; in the flowering stage, the order was tobacco, barley, rice. Leaves which had just completed flowering were found to have a high gas interchangeability. Therefore, the process of SO2 injury centers around center active leaves and upward and downward leaves in accordance with the absorption process of SO2 in terms of the gas interchangeability of the leaves. With increases in SO2 concentrations or treatment time, injury progresses from the cell, depending on differences in osmotic pressure.

31011

Fujiwara, Takashi

SULFUR ACCUMULATION FORM AND DEVELOPMENT OF INJURY(SYMPTOM IN PLANTS WHICH ABSORBED SULFUR DIOXIDE. Nippon Shokubutsu Byori Gakkaiho, vol. 36:127-131, 1970. Translated from Japanese. 11p.

An investigation was undertaken to determine the relation between sulfur accumulation in plants and the development of symptoms of injury after buckwheat was exposed to low concentrations of SO2, symptoms of damage began to appear on the first day after contact with concentrations in the 0.26 ppm range, on the third day in the 0.13 ppm range, and on the 16th day in the 0.065 ppm range. At the same time, the inorganic sulfur content of the plants increased. Soluble organic sulfur and protein sulfur, on the other hand, showed almost no difference from the amount in control plants. Absorption of sulfur from the soil and the atmosphere is discussed.

31266

Pesek, F.

THE REDUCTION OF FRUIT QUALITY BY INDUSTRIAL AEROSOLS. Rostlinna Vyroba, vol. 11:837-852, 1965. 2 refs. Translated from Czech. 27p., 1966 (?).

A droplet analysis method for determining the intensity of industrial smoke products (soot, dust, and ash) on the surface of fruit is described. The method involves removing the products from a one sq cm section of fruit, placing the products in one cc clean or distilled water, then transferring the resulting solution to glass slides for microscopic examination. The method gives more precise and more reliable results than that in which the epidermis of the fruit is placed under the microscope and the fruit evaluated by weight. Based on observations in fruit-growing regions of Czechoslovakia, smoke products damage fruit in both the period of blossoming and the development of fruit. Blossoms damaged by the products produce deformed fruit with little resistance to disease. Moreover, the smoke products combine with the wax on the surface of the fruit to form an organo-mineral layer that is insoluble in water and which, by interfering with the penetration of solor radiation, affects the coloration of the fruit.

31628

Andreyev, M. N., A. A. Kudryavtsev, E. N. Stepanov, S. N. Gerasimov, Y. E. Sazanov, and A. P. Kudryavtsev

TOXIC DYSTROPHY OF THE LIVER IN YOUNG PIGS. Veterinariya (Moscow), vol. 45:78-79, Jan 1968. Translated from Russian. Mundus Systems, McGregor, and Werner, Inc., Washington, D. C., 6p.

Experiments were undertaken to determine if toxic dystrophy of the liver in young pigs was caused by a deficiency of selenium in their feed. In the organs and tissues of sick young pigs, the selenium content was four to six times less than in healthy young pigs. Toxic dystrophy was experimentally induced in young pigs by giving them a dystrophagenous diet and carbon tetrachloride. One group of animals which was given a dystrophagenous diet and sodium selenite did not become diseased.

31735

Tsals, I. I.

THE DISTRIBUTION OF SELENIUM IN THE TISSUE AND ORGANS OF HENS. Veterinariya (Moscow), vol. 46:58-61, Aug. 1969. Translated from Russian. Mundus Systems, McGregor, and Werner, Inc. Washington, D. C., 10p.

The amount of selenium in various tissues and organs of chickens was dependent upon the quantity of selenium in their feed. When 0.1 mg of sodium selenite/kg of feed was administered to hens, their egg yield increased 9.3%. The content of selenium in the liver, ovaries, heart muscle, complex muscles, and blood cells, was also increased, while it was decreased in the kidneys.

31833

Yonemaru, Chutaro

ON THE INJURIOUS EFFECTS OF SULPHUR DIOXIDE UPON PLANTS. Noji Shikenjo Hokoku (Bull. Imp. Agr. Expt. Sta.), no 47, March 1927. 28 refs. Translated from Japanese. Mundus Systems, McGregor and Werner, Washington, D. C., 135p.

The injurious effects on sulfur dioxide upon plants are relevant to the direct rays of the sun; no injuries were observed during the night or in a dark room. However, when a mixture of sulfur dioxide and aldehyde was applied to plants, the same injurious effects emerged in the dark room as under direct sunlight. These effects are therefore not caused by the sulfur dioxide alone. Aldehyde, produced by the dissolution of organic acid present in the plants, and a-Oxysulfosaure, a compound of sulfurous acid and formaldehyde produced by the union of sulfur dioxide, were also involved. That the injurious effects of sulfur dioxide were limited to instances involving direct sunlight was attributable to the fact that the formation of aldehyde is facilitated by direct sunlight. The sulfur dioxide penetrates into the plant foliage through the stoma as well as the drainage hole on the leaf margin. The stoma and drainage hole smeared by vaseline showed no symptoms of injury. The degree of effects of sulfur dioxide greatly differed due to dry or damp air. When the air was damp, sulfur dioxide inhaling the moisture was converted not only into a minute fog shape, but also into relatively heavy sulfurous acid. Compared with ordinary gas, its movement was slow and easily stopped by plants or other blocks, thus providing ample time for penetration into the foliage. The effect of sulfur dioxide upon the yield of crops varied according to the kind of crops; the density of gas and weather conditions, with the contact by 5/1,000,000 and more capacity of sulfur dioxide, increased the injuries. Greater injuries occurred before and after the blossom period. The contact of sulfur dioxide after the blossom period influenced the new seed quality. Lists of plants tested, injuries sustained, and lengths of testing times are also included. Author summary modified)

32088

Ermarkov, V. V. and V. V. Koval skiy

THE BIOLOGICAL SIGNIFICANCE OF SELENIUM: SELENIUM ENDEMIC DISEASES. (Biologicheskoye znacheniye selena: selenoviye endemii). Usp. Sovrem. Biol., 65(2):267-284, 1968. 163 refs. Translated from Russian. Leo Kanner Assoc., Redwood City, Calif., 40p., May 1971.

Selenium influences cell growth and mitosis in organisms. There is a functional antagonism between sulfur and selenium, and under certain conditions selenium replaces sulfur in its organic compounds. The biochemical functions of selenium, on the strength of its physiochemical characteristics and its small amount in organisms, must lie in its role as catalyst. The effect of additions of selenium to the rations of animals is discussed. The interest and relationship of selenium with the processes of phosphorylation are described. The parallelism in effect between selenium and vitamin E is not clear with the exception of their common antioxidant behavior. The favorable therapeutic effect of small amounts of selenium in white sac sickness, its inhibiting of cell growth and capacity to protect biological systems from radiation are examined. (Author summary modified)

32183

Skye, Eric

EFFECTS OF SULFUR DIOXIDE ON PLANTS AND ANIMALS. In: Recommendations Relating to Norms for Sulfur Dioxide Content in Open Air. (Rekommendationer rorande riktvarden for svaveldioxidhalt i utomhusluft). Swedish Government Air Pollution Board, Stockholm, Communication 6601, 1965 (?). Translated from Swedish by Scientific Translation Service, Inc., Santa Barbara, Calif., p. 10-14, 1967.

The first plant organisms damaged by sulfur dioxide are the lichens on tree trunks. Herbs, grasses, and woody plants often show typical damage at concentrations as low as 30 ppm. Coniferous trees are attacked at the tips of the needles, damage then spreading toward the needle base. The parts attacked turn red or whitish in color. Grasses and liliaceous plants show brown spots at the tips of the leaves. Grass blades become limp and are streaked with brown. When severely attacked, trees, shrubs, and herbs show damage to the leaf surface between the veins. The site attacked turns yellow, brown, or red and the tissues dry rapidly. In animals, the respiratory tract is usually affected. The reaction of insects such as bees and butterflies is not known.

32334

Donaubauer, Edwin

SECONDARY DAMAGE IN REGIONS OF AUSTRIA EXPOSED TO POLLUTION. DIFFICULTIES IN DIAGNOSIS AND ASSESSMENT. (Sekundaerschaeden in Oesterreichischen Rauschschadensgebieten. Schwierigkeiten der Diagnose und Bewertung). Text in German. Polska Akademia Nauk, Zaklad Badan Naukowych Gornoslaskiego Okregu Przemyslowego, Mater. Miedzynarodowej Konf., Wplyw Zanieczyszczen Powietrza na Lasy, 6th, Katowice, Poland, 1968, p. 277-284. 10 refs. (Sept. 9-14.)

Secondary damage from pollution most frequently occurs through sunburn on peripheral susceptible tree stands in clearings of wooded areas. Such trees, damaged by the sun, attract pests and die. This applies especially to pine stands. In the pollution- exposed areas of Aichfeld near Judenburg and Gailitz-Arnoldstein, needles of mature pine stands suddenly turned brown in 1963 following the appearance of an additional pollutant (hydrofluoric acid) into the already sulfur dioxide-polluted atmosphere (first area) and intensification of SO2 emission (second area). A contributing factor was an exceedingly cold winter with temperatures 4 to 5 C below the long-term average. Pollution- exposed stands are more susceptible to infestation with the fungus Armillaria mellea which causes great damage in Austria to pine, spruce, and deciduous tree stands. Other pests which proliferate in pollution-damaged stands are Pissodes piceae, Cryphalus piceae, Ips typographus, and Pissodes harcyniae. Generally it is not easy to prove a causal relationship between emission and secondary damge: detection of damage in a pollution-exposed area is not sufficient proof. The task is easier where identical or similar stands in unpolluted areas are available for comparison.

32336

Ilmurzynski, E.

ATTEMPT OF THE INTRODUCTION OF CERTAIN NORTH AMERICAN TREE SPECIES TO FOREST PLANTATIONS IN INDUSTRIAL REGIONS. Polska Akademia Nau Zaklad Badan Naukowych Gornoslaskiego Okregu Przemyslowego, Mater. Miedzynarodowej Konf., Wplyw Zanieczyszczen Powietrza na Lasy, 6th, Katowice, Poland, 1968, p. 415-425. (Sept. 9-14.)

Cultures (0.28 ha in size) of white pine, red oak, Douglas fir, northern white cedar, and eastern hemlock of North American origin were planted experimentally in many localities of Poland including the Upper Silesian, Dabrowa, and Krakow industrial basins to study the effect of various biotic and abiotic environmental factors, including air pollution, pest infestation, and fungus diseases. Results obtained over a four-year observation period were encouraging with respect to the possibility of using some American tree species to replace susceptible domestic species which cannot withstand the effects of pollution in industrial areas. The relatively good health of white pine stands surrounded by dying domestic Scots pine trees was a case in point. Insect infestation was lower than in domestic species and the rapid healing of wounds caused by the Hylobius beetle demonstrated the superior regenerative power of the white cedar. Results obtained previously with the western red cedar and the western hemlock were also promising.

32342

Schnaider, Zbigniew and Zbigniew Sierpinski

FOREST CONSERVATION PROBLEMS IN THE UPPER SILESIAN INDUSTRIAL REGION. (Probleme des Forstschutzes im Oberschlesischen Industriebezirk). Text in German. Polska Akademia Nauk, Zaklad Badan Naukowych Gornoslaskiego Okregu Przemyslowego, Mater. Miedzynarodowej Konf., Wplyw Zanieczyszczen Powietrza na Lasy, 6th, Katowice, Poland, 1968, p. 45-62. 11 refs. (Sept. 9-14.)

33063

Chasseraud, J.

INFLUENCE OF THE URBAN ATMOSPHERE ON PLANTS USED IN PARKS AND GARDENS: FORTHCOMING CONCLUSIONS AND TECHNIQUES. (Influences du milieu urbain sur les vegetaux employes dans les espaces verts: conclusions et techniques qui en decoulent). Proc. Intern. Congr. Horticulture, vol. 15, part 3:60-74, 1958. Translated from French. Belov and Associates, Denver, Colo., 24p., May 30, 1970.

The conditions of plants in parks and gardens relative to the atmosphere and to the soil are discussed. A tall building can modify the life conditions of nearby trees, since a new microclimate is established. In the urban atmosphere, conifers appear to be the most sensitive to the presence of atmospheric pollutants. These pollutants most often come from combustion sources and internal combustion engines. The leaves of plants are well suited to retain the fine elements of particles, particularly tars and oils. By settling on the leaves, these substances form a film which reduces the respiration and chlorophyll function of the plant. Among the conifers, spruce and douglas are the most sensitive to sulfur dioxide; among the broad leaved trees, elm, birch, and catalpa are relatively sensitive. The distribution of pollutants is influenced by topographic factors and meteorological conditions. The tendency toward stagnation, accompanied by the accumulation of pollutants, is prevalent in shelter areas and in areas where the air is stable. Temperature inversions cause an accumulation of noxious products near the soil and are, therefore, detrimental to plant life. It is recommended that resistant species of plants be selected for the parks and gardens of urban areas. The soil conditions which affect plant growth are also discussed in detail.

33327

Taniyama, Tetsuro and Hiroki Arikado

STUDIES OF THE MECHANISM OF TOXIC GAS INJURY TO CROP PLANTS. IV. THE EFFECTS OF SULFUR DIOXIDE ON THE RESPIRATION OF RICE PLANTS. (Sakumotsu no gasu shogai ni kansuru kenkyu. IV. Suito no kokyusayo ni oyobosu aryusan gasu no eikyo). Nippon Sakumotsu Gakkai Kiji (Proc. Crop Sci. Soc. Japan), 38(4):593-597, 1969. 2 refs. Translated from Japanese, 14p.

Experiments were conducted to determine the effect of constant exposure to sulfur dioxide on respiration of rice plants, respiration being a major factor in their dry matter production. Rice seedlings were also studied for their ability to regain respiration by first subjecting them to gas treatment for one hour and then removing the gas from the air flow. Sulfur dioxide severely affected the respiration of rice seedlings, causing a linear drop in respiration with increases in gas concentration. A concentration of 60 ppm inhibited respiration after one hour even before gas removal, with no subsequent recovery of respiration. At one ppm, the respiration rate without exposure remained almost normal but declined after gas removal, without regaining the normal level after three hours. In experiments on rice plants at the highest tillering state, gas concentrations of one, five, 10, and 15 ppm accelerated respiration, while 40 and 60 ppm inhibited the respiration rate. The longer the treatment, the narrower the range of gas concentrations inducing respiration acceleration. When the respiration rate of plants at the highest tillering state was computed cumulatively for a four hour test period, it increased linearly with concentration level to a maximum at five ppm. The curve dropped after the maximum to the normal rate level at 29 ppm. Thus, concentrations above 28 ppm produce adverse effects. (Author summary modified)

34867

Bischoff, O. and Fr. Haun

POISONING OF DOMESTIC ANIMALS THROUGH COPPER AND ARSENIC CONTAINING FLY DUST. Deut. Tieraerztl. Wochenschr., 17(28):442-447, July 15, 1939. 8 refs. Translated from German. 19p.

Several weeks after reactivation of a copper smelter on the border between the states of Hesse and Westphalia, cattle, horses, chickens, and sheep in the area exhibited symptoms of poisoning. Subsequently, many animals died or had to be slaughtered. The poisoning was traced to the copper- and arsenic-containing fly dust emitted by the smelter and deposited on plants and grasses in grazing pastures, particularly in the presence of dew and fog. Early clinical symptoms of poisoning included conjunctivitis, stomach and intestinal catarrh, secretion of saliva, miscarriages, emphysematose foeti, retention of afterbirths, and reduction or complete stoppage of milk production. Autopsies of deceased or slaughtered animals revealed considerable enlargement of the liver. Liver copper concentrations were 80 mg/kg in cattle and horses and 75-250 mg/kg in sheep. Plant fly dust contained 2.5% copper and 23 mg arsenic trioxide (As_2O_3). Symptoms first appeared in animals 0.5-1.5 km from the smelter, but animals grazing as far away as 4.5-5 km were also affected. Of 2100 cattle in the four communities closest to the smelter, 520 animals perished. Milk production in the four communities was reduced by about 75%. Copper levels in animals and animal organs (liver, Kidney, spleen, heart, blood) are tabulated.

36159

Nikolayevskiy, V. S.

PHYSIOLOGICAL-BIOCHEMICAL PRINCIPLES OF THE GAS RESISTANCE OF PLANTS. In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature. Gas Resistance of Plants with Special Reference to Plant Biochemistry and to the Effects of Mineral Nutrition. M. Y. Nuttonson (ed.), Vol. 9, Silver Spring, Md., American Institute of Crop Ecology, 1971, p. 1-27. 126 refs. Translated from Russian. (Also: Uch. Zap., no. 222:5-33, 1969.)

Principal advances in research pertaining to the gas resistance of plants are reviewed. The influence of toxic compounds on the anatomical-morphological structure of leaves and the physiological-biochemical characteristics of plants is considered. Also, the species of plants resistant to various compounds in different physico-geographical zones have been ascertained. Investigators have undertaken detailed studies of the chemistry of injuries to plants by acid gases, as well as the chemical mechanism of transformation of sulfur dioxide in plants and its influence on the metabolism of carbon compounds, with the aid of isotopic techniques. Considerable attention has been given to the development of methods for studying gas resistance of plants. Of major importance for a successful diagnosis and study of the gas resistance of plants is the establishment of direct indicators characterizing the degree of plant resistance. The effects of ammonia, mercury, acids, fluorine, chlorine, and other pollutants on plants are described.

36161

Yatsenko, V. M. and V. S. Nikolayevskiy

EFFECTS OF MINERAL NUTRITION ON CERTAIN PHYSIOLOGICAL-BIOCHEMICAL CHARACTERISTICS AND GAS RESISTANCE OF FORAGE GRASSES. In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature. Gas Resistance of Plants with Special Reference to Plant Biochemistry and to the Effects of Mineral Nutrition. M. Y. Nuttonson (ed.), Vol. 9, Silver Spring, Md., American Institute of Crop Ecology, 1971, p. 34-49. 20 refs. Translated from Russian. (Also: Uch. Zap., no. 222:69-84, 1969.)

The feasibility of regulating the gas resistance of plants by means of mineral nutrition was established. Forage grasses exposed to sulfur dioxide were more resistant when treated with nitrogen and potassium. The positive effect of nitrogen is apparently due to its important role in protein metabolism, and that of potassium, to its role in the regulation of the permeability and ionic behavior of the protoplasm. Oxidizability, ascorbic acid, water-holding capacity, and oxidation-reduction potential can be used to indicate species differences in the gas resistance of forage grasses. Under the influence of fertilizers, the change of these indicators does not always coincide with the change in gas resistance. This makes it necessary to postulate that the indicators are connected only indirectly with the mechanism of plant resistance. (Author conclusions modified)

36162

Nikolayevskiy, V. S. and A. G. Mirosh.. kova

EXPERIENCE IN THE USE OF THE BIOCHEMOLUMINESCENCE METHOD FOR DIAGNOSING THE GAS RESISTANCE OF PLANTS. In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature. Gas Resistance of Plants with Special Reference to Plant Biochemistry and to the Effects of Mineral Nutrition. M. Y. Nuttonson (ed.), Vol. 9, Silver Spring, Md., American Institute of Crop Ecology, 1971. p. 50-53. 3 refs. Translated from Russian. (Also: Materialy Pervoy Ukrainskoy Konferentsii, Kiev, 1968, p. 115-120.)

The development of a biochemiluminescence method opens up new opportunities for the study of the interpretation of the biochemical aspects of the oxidation processes in plants under the influence of sulfur dioxide. A set of electronic instruments with a high sensitivity photomultiplier were used to record spontaneous and induced oxidation processes. Etiolated plants of forage grasses were more resistant to sulfur dioxide than green plants, requiring concentration 10 times higher than those required for green plants to produce damage. Under the influence of sulfur dioxide, the luminescence in etiolated plants increases. The activity of the luminescence is more pronounced in the resistant species, fescue, and less pronounced in timothy grass. Concentrated sulfur dioxide depresses the luminescence of both species. In etiolated plants there is no relationship between the amount of substances oxidized and the vulnerability of plants to sulfur dioxide. (Author conclusions modified)

36163

Nikolayevskiy, V. S. and A. T. Miroshnikova

GAS RESISTANCE AND CERTAIN BIOCHEMICAL CHARACTERISTICS OF ETIOLATED AND GREEN PLANTS OF FORAGE GRASSES. In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature. Gas Resistance of Plants with Special Reference to Plant Biochemistry and to the Effects of Mineral Nutrition. M. Y. Nuttonson (ed.), Vol. 9, Silver Spring, Md., American Institute of Crop Ecology, 1971, p. 54-68. 30 refs. Translated from Russian. (Also: Uch. Zap., no. 222:115-131, 1969.)

Etiolated and green plants of the meadow fescue and timothy show statistically significant differences in their vulnerability to sulfur dioxide at nearly all ages, thus making it possible to use the biochemiluminescence method for studying the gas resistance of plants. A direct relationship was observed in etiolated and green plants of both species between the amount of oxidizable substances, ascorbic acid, and vulnerability to sulfur dioxide. The degree of influence of sulfur dioxide on the ultrafaint luminescence of plants depends on their age, with the greatest effect observed at the age of greatest physiological activity. Sulfur dioxide causes a luminescence flash which is greater in the meadow fescue than in the timothy. (Author conclusions modified)

36164

Firger, V. V. and T. B. Karpova

EFFECT OF MINERAL NUTRITION ON THE METABOLISM OF CARBON-14 COMPOUNDS AND ON GAS RESISTANCE OF FORAGE PLANTS. In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature. Gas Resistance of Plants with Special Reference to Plant Biochemistry and to the Effects of Mineral Nutrition. M. Y. Nuttonson (ed.), Vol. 9, Silver Spring, Md., American Institute of Crop Ecology, 1971, p. 69-81. 14 refs. Translated from Russian. (Also: Uch. Zap., no. 222:85-97, 1969.)

Following a 10-second and 5-minute exposure to carbon-14 tagged sulfur dioxide, meadow fescue and timothy showed practically no differences in metabolism of the main groups of organic compounds. Under the influence of fertilizers, during a 5-minute exposure with C(14)02, the polymerization rate of carbohydrates was somewhat higher in the fescue than in the timothy; the percentage of the labeled carbon was higher in the starch and lower in sucrose. Changes in the chemistry of photosynthesis may be attributed both to the indirect effect of fertilizers, to species characteristics, and weather conditions. In the meadow fescue, in the presence of increased solar radiation, improvement in gas resistance under the influence of fertilizers is associated with an increase in synthesis of sugars and a reduction in the synthesis of amino acids and organic acids; in the timothy, on the contrary, an increase in the synthesis of the latter compounds is observed. (Author conclusions modified)

36165

Nikolayevskiy, V. S., V. V. Firger, and G. A. Vaseva

METABOLISM OF CARBON-14 COMPOUNDS IN FORAGE GRASSES AND THE EFFECT OF SULFUR DIOXIDE ON IT. In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature. Gas Resistance of Plants with Special Reference to Plant Biochemistry and to the Effects of Mineral Nutrition. M. Y. Nuttonson (ed.), Vol. 9, Silver Spring, Md., American Institute of Crop Ecology, 1971, p. 82-91. 18 refs. Translated From Russian. (Also: Uch. Zap., no. 222:57-67, 1969.)

Forage grasses differing in gas resistance to sulfur dioxide also differ in their content of oxidizable substances and ascorbic acid. Meadow fescue, a resistant species is characterized by a reduced content of oxidizable substances and ascorbic acid. Under the influence of sulfur dioxide, an increase in the content of oxidizable substances is sometimes observed. The meadow fescue as compared with timothy is characterized by a reduced intensity of photosynthesis and a lower rate of absorption of sulfur dioxide. Under the influence of sulfur dioxide, definite changes in the metabolism of carbon in forage plants are observed which are attributable to their gas resistance. (Author conclusions modified)

36166

Nikolayevskiy, V. S. and V. V. Suslova

EFFECT OF SULFUR DIOXIDE ON PIGMENTS OF FORAGE GRASS. In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature. Gas Resistance of Plants with Special Reference to Plant Biochemistry and to the Effects of Mineral Nutrition. M. Y. Nuttonson (ed.), Vol. 9, Silver Spring, Md., American Institute of Crop Ecology, 1971, p.92-106. 22 refs. Translated from Russian. (Also: Uch. Zap., no. 222:99-114, 1969.)

The forage grasses meadow fescue and timothy, which differ in gas resistance to sulfur dioxide, are also markedly different during the tillering stage from the standpoint of the nature of the changes in their vulnerability in relation to gas concentration. The fescue is characterized by an almost directly proportional dependence, and the timothy, by a logarithmic dependence. During the ontogeny of the timothy, regular decrease of gas resistance occurs, and a decrease of the sublethal and lethal sulfur dioxide concentrations results from intensification of the physiological-biochemical processes with the onset of the productive stage. During ontogeny, timothy shows a general increase in the concentration of the pigments without any appreciable change in their proportions. Under the influence of sulfur dioxide, certain differences in the destruction of individual pigment systems are observed in the plant species studied during their tillering stage. Low sulfur dioxide concentrations apparently cause an intensification of the enzymatic oxidation of the pigments, while high sulfur dioxide concentrations, by inactivating the enzymes, cause a stabilization of the content of the pigments. (Author conclusions modified)

36993

Haut, H. van and H. Stratmann

EXPERIMENTAL STUDIES ON THE EFFECTS OF SULFUR DIOXIDE UPON VEGETATION. (Experimentelle Untersuchungen ueber die Wirkung von Schwefeldioxyd auf die

Vegetation). Forschungsber. Landes Nordrhein-Westfalen, no. 884:1-63, 1960. 33 refs. Translated from German. Leo Kanner Assoc., Redwood City, Calif., 73p., Aug. 1971.

Plants were exposed to sulfur dioxide concentrations in test chambers in order to determine the effects of the following parameters upon the causation of damage: concentration and exposure time, stage of development, climatic factors, and nutritional factors. These effects are considered for agricultural plants, flowers, deciduous trees, and conifers. Results from the environmental chamber studies cannot be applied directly to field conditions, but they provide important reference information for the determination of tolerance limits in field experiments and thus for the evaluation of an emission level with regard to the danger to vegetation which it engenders.

I. EFFECTS-MATERIALS

10094

Narasaki, Masaya

STAINING OF BUILDING CAUSED BY SUSPENDED DUST (FOR THE EFFECT OF TEMPERATURE GRADIENT). Text in Japanese. Kuki Seijo (Japan Air Cleaning Assoc.) (Tokyo), 5(4):6-12 1967. 12 refs.

Dusty air is responsible for the unclean appearance buildings. A finished surface of a building reacts to the air surrounding it and creates a temperature gradient thus explaining the so-called 'pattern staining'. An imbalance in temperature gradient causes the inner structure to show through with black outlines, and is caused by 'thermal precipitation' which takes plac when the surface is cooler than the dusty air. According to Epstein's theory, if dusty air touches a heated surface, a vacuum (free of dust) is created between the surface and the dusty air and the dust is repelled. The heated surface remains clean shile coole surfaces attract the dust suspended in the air. An alabaster ceiling panel, wooden beam panel, and a heater behind the panel wer used to prove that the concentration of the deposited dust particle is directly proportional to the temperature gradient. It is possib to predict the concentration of the deposited dust particles if the following are known: 1) the air velocity near the surface; 2) the temperature defference between the surface and air flow; 3) the concentration of the dust suspended in the air; and 4) the length exposure.

13369

Hukui, Saburo and Akihiro Yamamoto

STUDIES ON THE CORROSION OF METALLIC MATERIALS BY POLLUTED AIR. (Osen kuki ni yoru kinzoku zairyo no fushoku ni kansuru kenkyu). Text in Japanese. Netsu Kanri (Heat Engineering, Tokyo), 21(6):28-44, June 1969. 9 refs.

An outdoor test which exposed metallic materials to falling dust, SO2, and salt particles was performed on the roofs of buildings in 13 places in Japan selected at random. Twenty-nine kinds of metals, including iron, steel, stainless steel, aluminum, and zinc plating were used. Severity of corrosion depended upon the severity of air pollution, and the corrosion was related to the amount of SO2 in the ambient air and SO4(2-) and Cl(-) in the falling dust. Iron was the most corroded metal, followed by steel, SUS 22, aluminum, and SUS 27. Zinc plating and metallic paints showed little tendency to corrode (about 1/100 that of iron). Dirt stains in metallic paints were mostly due to corrosion of iron particles. Experimental corrosion of metallic materials was performed indoors using SO2 gas, and periodic exposure to clean water, ultravielet light (using an arc light), and heat to compare the results with those resulting from outdoor exposure. The results did not correlate well, since corrosion in the ambient air was confounded by other pollutant particles. Therefore, corrosion tests under experimental conditions should include pollutant particles found in the ambient air.

16404

Barton, K. and S. Bartonova

MECHANISM OF THE CORROSION OF FE, ZN AND CU IN A HUMID ATMOSPHERE CONTAINING HCL VAPORS. (Mechanismus der Fe-, Zn- und Cu-Korrosion in feuchter HCl-Daempfe enthaltender atmosphaere). Text in German. Collection Czech. Chem. Commu. (Prague), 32(7):2431-2438, 1967. 6 refs.

Steel containing a small amount of carbon, electrolytic zinc, and electrolytic copper in the form of thin plates 30 by 80 mm with a thickness between 0.8 to 1 mm were used to study the corrosion mechanism at temperatures of 20, 30 and 40 C; a relative humidity of 80%; and an HCl content of 0.0007 to 0.002% (by volume). The stationary state characterized by constant quantity and composition of the corrosion products and a linear dependence of the corrosion on time was established. After the stationary state had been reached, the corrosion kinetics iron were goverend by HCl formation during the rust development. With the zinc sample, the corrosion speed decreased after the stationary state had been reached. This was due to a reaction of the hydroxide and the alkaline zinc chloride with HCl, where soluble ZnCl2 is formed. The speed of this process is influenced by the transport of the gaseous HCl to the boundary atmosphere/corrosion product, as well as by the adsorption and composition of the product. With the copper sample, the decisive partial process of the corrosion kinetics in the stationary state was the destruction of the CuCl layer covering the Cu2O layer. The process is likewise determined by the transport of the gaseous HCl to the boundary atmosphere/ corrosion product, by the HCl adsorption, and the composition of the product.

22078

Kobayashi, M., Tatsuro Mikami, and Yasuhiro Senda

AIR POLLUTION AND COUNTERMEASURES FOR INTERNATIONAL TELECOMMUNICATIONS EQUIPMENT. (Kokusai denkitsushinsetsubi no kukiosen to taisaku). Kuki Seijo (Clean Air - J. Japan Air Cleaning Assoc., Tokyo), 3(6):45-51, 1966. Translated from Japanese. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 20p., Dec. 3, 1969.

Palladium contactors for the international telecommunications switchboard were stained at contact points, lowering the efficiency of the mechanism and shortening its working life. The analysis of the stains led to the suspicion that organic as well as inorganic substances and dust particles in air contributed to staining by chemical reaction due to sparks and frictions. The investigation of the atmosphere showed that minute positively charged dust particles pass through the electrostatic dust collectors and are likely to adhere to the negative contact points. Oleagenic floor wax emits gases that contain much turpentine oil and the gases enter the switchboard room through the air conditioning system. In addition, multipanel oil was also suspected of causing some damage. Simulation in the specially constructed dust chamber showed that the charged particles and multipanel oil as well as inorganic gases cause no damage, but cigarette smokes, large fibrinous dust particles and especially the gases from the oil wax are detrimental to the contactors. The solution to the problem of the stained contactors was to alter the general method of cleaning the floor by changing from oil wax to water wax, and to take sufficient caution while the building is being repainted.

24972

Strekalov, P. V. and G. K. Berukshtis

ATMOSPHERIC CORROSION OF ZINC AND CADMIUM-COATED STEEL AND THE COEFFICIENTS FOR RECALCULATING THE RESULTS OF ACCELERATED CORROSION TESTS INTO DATA FOR SERVICE CONDITIONS. In: Corrosion of Metals and Alloys, Collection No. 2. N. D. Tomashov and E. N. Mirolyubev (eds.), Izdatel'stvo 'Metallurgiya,' 1965, p. 221-233. 2 refs. Translated from Russian, by Ch. Nisenbaum, Israeli Program for Scientification Translations, Jerusalem, 1966.

The rate of corrosion of zinc and cadmium deposits on steel was studied in field tests in regions of the Soviet Union that differ widely with regard to climate and contamination of air by sulfurous gases and seawater aerosols and also in accelerated corrosion testing chambers simulating, respectively, heat and moisture, sulfurous gases, and sea mist. Corrosion time curves obtained for the field tests show that the corrosion of zinc can be accelerated 10 times and that of cadmium 15 times in the presence of sulfurous gases and chlorides. The rate of corrosion of chromated deposits is equal to that of nonchromated deposits. In all climatic regions the appearance of zinc deposits changed more than that of cadmium deposits. Corrosion time curves for the chamber tests show that zinc deposits corrode two to three times more rapidly than cadmium deposits and nonchromated zinc deposits twice as rapidly as chromated deposits. The rate of corrosion was lowest in the heat and moisture chamber and highest in the sulfurous gas chamber. However, these chambers do not give scientifically-based quantitative data on corrosion resistance of deposits under natural conditions because the coefficients of acceleration obtained in the same chamber are different for different deposits. The sea mist an heat and moisture chambers, but not the sulfurous gas chamber, can be used for characterizing of corrosion damage in an industrial atmosphere. In the sulfurous gas chamber, the concentration exceed that under service conditions by about 2-4 orders of magnitude.

25937

Barton, K. and D. Cermakova

CURRENT PROBLEMS OF THE THEORY OF ATMOSPHERIC CORROSION. Prot. Metals (USSR) (English translation from Russian of: Zashch. Metal., 3(2):112-116, March-April 1967. 21 refs.

Research on the mechanism and kinetics of atmospheric corrosion is taking place along the following lines: 1) electrochemical studies of atmospheric corrosion processes; 2) investigations of the effects of atmospheric pollution; 3) investigations of the influence of corrosion products; and 4) investigations of the relation between prolonged exposure and the characteristics of different climatic regions. Attention is drawn to progress or lack of progress in each field and to specific problems requiring further study. A complex investigation of corrosion along all the lines indicated should permit the formulation of a precise theory of corrosion. This in turn will facilitate the development of scientifically-based engineering methods of protection against atmospheric corrosion.

27739

Berukshtis, G. K. and B. G. Klark

ATMOSPHERIC CORROSION OF STEEL, ZINC, CADMIUM, COPPER, AND ALUMINUM IN DIFFERENT COASTAL AND CONTINENTAL REGIONS. In: Corrosion of Metals and Alloys, Collection No. 2, N. D. Tomashov and E. N. Mirolyubov (eds.) 1963 (?). 9 refs. Translated from Russian by Ch. Nisenbaum, Israel Program for Scientific Translations, Jerusalem, p. 281-297, 1966. NTIS: TT67-51398

The influence of meteorological conditions, contamination of the air, and the products of corrosion formed, on the rate of atmospheric corrosion of metals in industrial, rural, and coastal regions of the USSR is investigated. The climates in the regions in which the tests were carried out differ greatly. The mean annual temperature varies from 1.6 C in the Northern coastal region to 15 C in Batumi. The mean annual relative humidity varies considerably less (from 69% in Moscow to 82% in Zvenigorod. The duration of wetting of the metal by atmospheric precipitations varies from 1342 hr/year in Moscow to 3161 hr/year in Batumi. The variation in the number of hours of sunshine in these regions is about 2-fold, in the velocity of the wind 5-fold, and in the contamination by sulfur dioxide and salts of sea water 20 - 40-fold The results of corrosion tests showed that depending on the variation in the climatological conditions the rate of corrosion of steel and zinc in the above regions varies 2 - 3-fold; of copper, 4-fold; of cadmium, 5-fold; and of aluminum, 72-fold. The rate of corrosion of metals is lower in testing boxes than in the open atmosphere. For steel, the rate in the boxes is (25%) of that in the open atmosphere, and for zinc, copper, and cadmium the factor is 33.67%. The rates of corrosion of aluminum in the open atmosphere and in the testing boxes are the same in all climatological regions. It is possible to make scientifically-based calculations on the rate of corrosion of metals in the open atmosphere on the basis of the meteorological factors and the contamination of the atmosphere, taking into account the conditions of testing, the nature of the metal, and the physicochemical properties of the products of corrosion. The data obtained can be used by designers for determining the necessary protective deposits which must be plated on instruments and installations. The results of this investigation should be used for the development of methods of accelerated corrosion tests, and for the determination of coefficients which would convert the data of these tests into those applicable to service conditions. (Author summary modified)

31007

Chang, Hun Koo and Jong Soo Cho

TECHNICAL LECTURE ON STRESS CORROSION OF METALS. (REPORT 1). Kumsokhakhoeji (Korea), 6(1):41-43, April 1, 1971. 5 refs. Translated from Korean. Scientific Translation Service, Santa Barbara, Calif., 12p., 1971.

Various corrosion phenomena are discussed, including the appearance of stress corrosion in different metals. Internal and external stresses, environment, structure of the metals, and temperature are important variables in stress corrosion. The effect of different environments is considered for aluminum alloys, copper alloys, gold alloys, led, magnesium alloys, nickel, common steel, stainless steel, and titanium alloys.

31641

Kauczor, Egon

CRACKS RESULTING FROM CORROSION FATIGUE. Prakt. Metallogr., 2(2):67-69, 1965. 4 refs. Translated from German. Mundus Systems, McGregor, and Werner, Inc., Washington, D. C., 5p.

The difference between stress corrosion and corrosion fatigue is briefly explained. The cracking of metallic materials under the simultaneous action of certain corrosive agents and static tensile strain is designated as stress corrosion. Stress corrosion is frequently brought on by internal stresses within the raw materials themselves. Corrosion fatigue is, on the other hand, the decline of the endurance limit of stress caused by the action of a corrosive agent. Two typical examples of corrosion fatigue are indicated. The durability of stainless steel in resisting corrosion stress can be explained by its ability to form passive surface layers out of invisible oxide films, which in turn prevent corrosive agents from attacking the metal and so protect it from corrosion.

31643

Andreev, Yu. V., V. A. Shuvalov, and V. V. Gerasimov

THE EFFECT OF SURFACE CONTAMINATION OF AUSTENITIC STAINLESS STEEL ON CORROSIVE DETERIORATION AT VARIOUS TEMPERATURES. Fiz.-Khim. Mekh. Mater., 6(2):107-109, 1970. 15 refs. Translated from Russian. Mundus System, McGregor, and Werner, Inc., Washington, D. C., 7p.

An investigation was undertaken to determine the effect of surface contamination of austenitic stainless steel on its corrosive deterioration in a vaporized environment at 100-110 C and in an environment at room temperature. Various salts were used to coat the specimen of sheet steel. The presence of crystal hydrates as the products of corrosion causes condensation with a relative humidity much lower than 100%, and indicates a transition from a purely chemical mechanism of corrosion to an electrochemical mechanism. Cracks appear more quickly when the steel is coated with iron and copper chlorides than with sodium chlorides.

J. EFFECTS-ECONOMIC

01760

Y. Oka

STATUS AND FUTURE PROSPECT OF PETROLEUM REFINING INDUSTRY. Nenryo Kyokaishi (J. Fuel Soc. Japan, Tokyo) 45, (471) 490-4, July 1966.

The author outlines various oil refining equipment and processes. That the oil industry is as prosperous as it is today is due to the scale-up of equipment for meeting the rapid increase in the demand of products, progress of process engineering and further advances in catalysts. The oil industry involves political problems; for example most of the naphtha is imported from the Middle East, where the future supply is insecure. Public nuisance is another big problem e.g., desulfurization of heavy oil, removal of sulfur dioxide and water pollution in the seaside industrial zones. (Author summary)

13952

Lindberg, Walter

AIR POLLUTION IN NORWAY. I. THE GENERAL AIR POLLUTION IN NORWEGIAN CITIES AND INDUSTRIAL TOWNS. (Den alminnelige luftforurensning i Norge. I. Generelt om luftforurensning i byer og tettbygde strok.) Translated from Norwegian. Oslo Univ. (Norway), p. 1-65, 1968. 12 refs

General information is presented on air pollution in Norway with attention focused on (1) the sources and types of pollutants: motor vehicles, heating plants, incinerators, (2) air pollution levels in the cities, including dustfall, SO2, and smoke measurements in Oslo, Sweden, (3) special investigations (sulfuric acid fog), the chemical composition of solid particulates in smoke and suspended dust, polynuclear hydrocarbons and particulates, trace elements, (4) pollutants in Norwegian cities other than Oslo, (5) directions for medicohygienic evaluation of pollution levels in cities and other densely populated districts and industrial regions, and (6) an evaluation of the economic consequences of air pollution.

17203

Oels, Heinriche

AIR POLLUTION PROBLEMS IN WEST GERMANY AND THE ROLE OF INDUSTRY. (Luftforurensningsproblemer i Vest-Tyskland industriens innsats). Text in Norwegian. Tek. Ukeblad (Oslo), 116(45):1245-1247, Dec. 1969.

West Germany has been occupied in the last decade with reducing emissions of dust and smoke. Effectiveness of dust filters has increased threefold, and filtration is more economical. The dust content can now be reduced to 150 mg/cu m for an emission rate of 100,000 cu m/hr. In 1950, the dust output from the West German cement industry was 3.5% of the clinker produced; in 1967, it was 0.15%. Dust output from the manufacture of calcium carbide was reduced to 3 mg/cu m of exhaust gases. Attention now centers on reducing sulfur dioxide emissions. An electric power plant in Essen absorbs it with a new type of activated carbon, recovering the SO2 for the manufacture of H2SO4, the cost per 1000 kWh being about 1 DM (25 cents), and this can be further reduced. Government standards now limit the sulfur content of fuel oils to 1.8%. About 20% of the total SO2 emission in West Germany comes from sulfuric acid plants. A new 'double contact' process can reduce SO2 emissions of such a plant from 17 to 3 kg per ton of H2SO4 produced. Nitrogen oxides emitted from nitric acid plants have been reduced by 50% with special absorption equipment. New legislation sets a maximum average of 2 mg/cu m for fluorine emissions, or 5 mg for short intervals. Readings as high as 2.7 mg have been recorded above the Ruhr from January 1, 1966, to December 31, 1968. During that period, industry in North Rhine-Westphalia invested 4,000,000,000 DM on air pollution problems related to existent operations and about 275,000,000 DM on those related to new ones. Exhaust purification for the 2-year period cost 3,000,000,000 DM, plus an additional 30,000,000 for research - this in comparison with a gross national product of 300,000,000,000 DM per year. The total amount spent by industry is small compared with the damage caused, which amounts to 50 DM per capita per year, or 3,000,000,000 for the entire republic, not including losses due to sickness or sanitation problems.

17658

Pelz, E.

ECONOMIC MEASURES AGAINST SMOKE DAMAGE IN THE FORESTS OF THE GERMAN DEMOCRATIC REPUBLIC. (Hospodarska opatreni proti kourovym skodam v lesnim hospodarstvi Nemecke demokraticke republicky). Proc. Conf Effect Ind. Emissions Forestry, Janske Lazne, Czechoslovakia, 1966, p.X1-1 to X1-25. 16 refs. Translated from Czech. Franklin Inst. Research Labs, Philadelphia, Pa., Science Info. Services, April 24, 1969.

While in 1955 the extent of smoke damage in the German Democratic Republic forests was estimated at 8000 to 10,000 ha, the questionnaires circulated among the county councils in 1956/1957 revealed 10,000 to 15,000 ha. The estimate for 1961 had jumped to 85,000 ha. Now, the area of smoke damage is 200,000 ha and, according to the prognosis of industrial development will soon increase by another 75,000 ha. Today, smoke is attacking about 7% of the entire forest area and in the very near future, this figure will increase to 10%. Forestry enterprises are responsible for short-term planning within the framework of the planned preventive measures and the particular smoke damage pattern. Both for long-term planning of the development of economic areas, and for planning of economic measures suitable for the individual forestry enterprise, a framework has to be found based on general knowledge of the science of smoke damage which enables separate localities to adjust their needs to particular demands of the individual instances. Using Czechoslovak experience, a four- degree scale based on the proportion of severely injured trees in the stand, occurrence of decayed trees, structural formation of the stand, and extent of previous calamities have been constructed. It is concluded that the task of forest management is the elaboration of prerequisites for the successful fighting of smoke hazard.

18266

Garber, K.

THE FLUORINE CONCENTRATION OF PLANTS. (Ueber den Fluorgehalt von Pflanzen.) Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, Contract No. CPA 22-69-30, Project No. C 2423, 10p., 1968. 10 refs.

Data are presented which indicate (1) that the fluorine intake by plants is independent of the fluorine concentration of the soil, and (2) that the natural fluorine content of plants lies between 0.2 and 2.0 (maximum 3.0) mg per 100g dry substance. Any higher concentrations can be traced to F containing immissions.

24309

Mammarella, Luigi

26432

RESULTS OF THE 1968 ESTIMATE. (I risultari della stima per il 1968). In: Public Campaign Against Pollution: A Summary. (L'intervento pubblico contro l'inquinamento: Rapporto di sintesi). Text in Italian. Gianni Scaiola (ed.), Italy, June 1970. p. 85-107, 9 refs.

The economic damage to the tourist trade in Italy is concerned mainly with water pollution problems (damage sustained by those who earn their income from bathing beaches, lake resorts, and the recreational use of inland waters, such as fishing). Figures are also given on the damage to drinking water and water for industrial use, damage to ecology, real estate, buildings, and automobiles. The extra cost of housecleaning and of extra power needed for lighting (due to decrease incidence of sunlight) are also estimated. The city of Genoa was chosen for studies of this type of damage.

26443

COMPARISON OF COSTS AND BENEFITS: CONCLUSIONS AND SUGGESTIONS FOR IMPLEMENTATION. (Il confronto tra costi e benefici: conclusioni ed indicazioni operative). In: Public Campaign Against Pollution: A Summary. (L'intervento pubblico contro l'inquinamento: Rapporto di sintesi). Text in Italian. Gianni Scaiola (ed.), Italy, June 1970. p. 137-174. 27 refs.

A confrontation is made between the costs of a national pollution control program in Italy and the economic benefits that would result. For the period 1970-1985, the cost of construction, maintaining and operating pollution control measures would be about 7.85-9.00 trillion lire, while the direct benefits caused by the elimination by these types of pollution can be estimated at 8.0-12.0 trillion. All figures are based on the monetary value of the lire as of 1968. The investment costs are broken down into categories, which include industrial emissions, automotive emissions, domestic heating, and various sources of water pollutin. The figures given represent totals for air and water pollution, considered in the same package.

K. STANDARDS AND CRITERIA

06778

(INDUSTRY AND ATMOSPHERIC POLLUTION IN GREAT BRITAIN.) Industrie et pollution atmospherique en Grande Bretagne. Centre Interprofessionnel Technique d'Etudes de la Pollution Atmospherique, Paris, France. (1967.) 6 pp. Fr. (Rept. No. CI 310.) (C.I.T.E.P.A. Document No. 24.)

A summary of the basis of governmental action in Great Britain in the struggle against industrial emissions is outlined. The regulations imposed by the 'Alkali Act' are in most cases based on 'the most practical means.' Standards are given for chimney heights. Statutory limits are given for various materials emitted such as hydrochloric acid, sulfuric acid, nitric acid, hydrogen sulfide, chlorine, arsenic, antimony, cadmium, and lead. The construction of tall buildings tends to reduce the benefits obtained by tall chimneys. A better knowledge of the effects of pollutants should be obtained so as not to burden industry with unnecessary expense in their control. It is urged that international standards for emission be adopted.

16116

Koehler, W.

PRESENT POSITION IN COMBATING AIR POLLUTION AND NUISANCE IN THE CEMENT INDUSTRY. (Stand der Emissionsbekaempfung in der Zementindustrie). Text in German. Zement-Kalk-Gips (Wiesbaden), 58(11):493-500, Nov. 1969. 12 refs.

Prior to a discussion of present achievements in combating pollution and noise in the cement industry, the composition of emissions by this industry is reviewed. Apart from dust, waste gases from cement kilns contain nitrogen, carbon dioxide, oxygen, and water vapor. The sulfur dioxide concentration is low because it is chemically bound as sulfate in the clinker and the dust. No gaseous fluorine emissions have ever been determined; the carbon monoxide concentration is negligible. Dust emissions sank from about 3.5% in 1950 to 1.5% in 1957, and to 0.15% of the clinker production in 1967, although the production increased from 11 million tons to 33 million tons. In the vicinity of the Westphalian industrial center comprising 15 cement plants, an average dust fall of 0.75 g/sq m/day was measured in 1950; now, the annual average is down to 0.42 g/sq m/day. The VDI (Association of German Engineers) Guideline 2094 recommends a maximum allowable emission concention of 150 mg dust/standard cu m. In 1950, only 15% of the rotary kilns were equipped with electrostatic precipitators; in 1967, more than 93% had precipitators. The VDI Guideline 2058 provides for noise abatement in the cement industry. It recommends limitation of noise in primarily industrial centers to 70 dB and in residential areas with interspersed cement factories, to 55 dB/day and 40 dB/night.

21840

Stratmann, Heinrich

THE APPLICATION OF AIR ANALYSIS TO THE EVALUATION OF THE EFFECT OF SULPHUR DIOXIDE UPON VEGETATION. (Die Anwendung der Luftanalyse zur Beurteilung von Schwefeldioxyd-Einwirkungen auf die Vegetation). Staub, Reinhaltung Luft, 21(2), 1961. 8 refs. Translated from German. Belov and Associates, Denver, Colo., 14p., April 30, 1970.

'Maximum Emission Concentrations' (MEC-values) are laid down to limit permissible emissions. They are derived from so-called tolerance limits which are obtained from the relationship between the emission and its harmful effect. In the case of the effects of sulfur dioxide on vegetation, it has been shown how the tolerance limits are obtained from the threshold-of-irritation function. They are not identical to the MEC-values which can only be derived from them by means of an additional definition. Above all, the permanently changing conditions of emission are decisive for this additional difinition. This must be taken into account if supervision of the MEC-values is to be made possible by the aid of air analysis. (Author summary)

24907

Stratmann, H.

THE MEASUREMENT OF AIR POLLUTION AND THE ESTABLISHMENT OF CRITERIA FOR THE EVALUATION OF AIR QUALITY. (Die Messung der Luftverunreinigungen und die Aufstellung von Kriterien fuer Beurteilung der Luftqualitat). Air Pollution Proc. First European Congr. Influence Air Pollution Plants Animals, Wageningen, Netherlands, 1968, p. 287-301. Translated from German. Belov and Associates, Denver, Colo., Oct. 8, 1970.

Air quality criteria are valuable with respect to suspected or actual effects of air pollution. They are derived in turn from criteria which describe, respectively, emission and effects criteria. A model is presented for formulating a relationship between suitable emission criteria and the corresponding effects criteria. The model, which represents the average conditions of various groups of objects, can be used for estimating possible damages and should serve as a basis for establishing emission limits. Also discussed are measuring techniques and their application to emission control.

25087

AGREEMENT CONCERNING THE PUBLIC NUISANCE CONTROL MEASURES OF NIPPON CHEMICAL INDUSTRIES, LTD., TOKUYAMA WORKS. (Nippon kagaku kogyo tokuyama kojo no kogai taisaku ni kansuru kakuyakusho). Text in Japanese. Sangyo Kogai (Ind. Public Nuisance), 6(9):743-747, Sept. 15, 1970.

The city of Tokuyama in Yamaguchi Prefecture reached an agreement with Nippon Chemical Industries, Ltd. concerning the emission of chromium compounds from its factory. Aside from the various agreement terms on the pollution prevention, monitoring, and control, the emission standard for the chromium pollutants in air and water is recorded. The maximum allowable concentrations (24-hour average) are 0.0015 mg/ N cu m as chromium trioxide in the atmosphere and 2 ppm (as valence six ion) in water. Some of the measures taken are: relocation of the sodium dichromate kiln stacks, improvement of the electric dust collectors, and indirect drying process. In addition to the agreement the followin data are supplemented: the environmental standards for chromium in various countries, the method of calculating the emission standard, the effects of chromium on humans and plants, various water quality standards for chromium ions, effects of chromium on fish, and the construction plan of the chemical company for pollution control facilities. Lastly, the hearings of the technical subcommittee of the public nuisance committee of the city and the answers given by the Nippon Chemical Industries are summarized. The main issues were the height and the position of th stacks, electric dust collectors, wet dust collectors, filter type collectors, discharge waters, control measures of chromium ion discharges, sulfur dioxide emission in the atmosphere, and noise.

34866

Joursset, D.

TESTING IN COUNTRIES OF THE EUROPEAN COAL AND STEEL COMMUNITY. (Normalisation des epreuves fonctionnelles respiratories dans les pays de la Communaute Europeenne du Chabron et de L Acier). Poumon Coeur (Paris), vol. 10:1145-1159, 1960. Translated from French. Translation Consultants, Inc., Arlington, Va., 22p.

The European Coal and Steel Community has proposed that its six member countries adopt standardized functional respiratory tests, spirographic terminology, and respiratory physiopathological symbols. The recommendations are presented along with the results of a statistical analysis of data from spirographic examinations of 3000 subjects, 18-83, in the six countries. Ventilation values for spirographic measurements should be supplemented by listing ventilatory frequency, and respiratory equivalents are to be expressed in liters of air ventilated per liter of oxygen consumed or carbon dioxide removed. The spirographic method, rather than the Douglas pouch, is preferred for maximum ventilation measurements. The tests are to be recorded for three different frequencies greater than 30/min, the duration of each test running between 15-30 secs. The recommended symbols differ from those proposed in the U. S., especially in that volumes, flows, and concentrations are designated by the same symbols for both gaseous and blood phases. The statistical analysis indicated the need to consider the variation of ventilatory volumes with age. Tables of standard values, as a function of age, vital capacity, residual volume, and forced expiratory volume, were obtained by a statistical filtering out based on constancy of variance with age.

L. LEGAL AND ADMINISTRATIVE

00539

H. Stephany

TYPE AND EMISSION QUANTITIES OF INDUSTRIAL AND DOMESTIC FLUE GASES AND VEHICLE EXHAUST GASES. (Art und Emissionsmengen von Industrie-, Hausbrand-und Kraftfahrzeug-Abgasen.) Erdoel Kohle (Hamburg) 19(6):457-461, June 1966.

Types of air pollution which occur in Germany are discussed. The Clean Air Committee of the Association of German Engineers is described. The committee's program and published regulations for the limitation of emissions are tabulated.

01528

K. Guthmann

(NEW KNOWLEDGE AND EXPERIENCE IN THE PURIFICATION OF AIR IN FOUNDRIES.) Neue Erkenntnisse und Erfahrungen bei der Reinhaltung der Luft in Huttenwerken. Radex Rundschau (Austria), No: 3: 139-162, June 1966.

German laws, passed by the Federal Government, requiring maintenance of clean air, are discussed. Maximum allowable emission values for dusts, gases, and smokes are given. Programs established for research on the measurement of dust and SO2 and warning devices for smog are described. Other research described is being conducted on the removal of brown smoke in basic steelworks and oxygen-blowing steelworks, recovery of converter gas, possibilities for utilizing accumulated dust, removal of fluorine from exhaust gases and removal of odor from exhaust gases.

02059

J. P. Detrie.

STATISTICAL STUDIES OF THE EMISSIONS IN PARIS AND THE DEPARTMENT DE LA SEINE. Etudes Statistiques des Emissions Dans Paris et la Departement de la Seine. Proc. (Part I) Intern. Clean Air Cong., London, 1966. (Paper VII/3). pp. 219-23.

In order to control the air pollution caused by domestic fires and commercial and industrial heating plants in Paris, restrictions on the use of fuels of high sulphur content and certain emission limits were established in the Orders of August 1964. In order to judge the effectiveness of these new experimental regulations, it was necessary to estimate the amounts of the emissions and the resulting air pollution using available statistics and taking the meteorological data into account. The results, which have been obtained from the yearly measurements or estimates for five years and from the monthly and daily measurements for three years are set forth in the form of symmarized diagrams in this report. In spite of a noticeable reduction in air pollution in 1965, it is not yet possible to decide upon the effectiveness of the new regulations. However, this investigation leads to formulating some hypotheses which, if they are verified, may influence future legislation for the control of air pollution in big towns. (Author abstract)

02301

LAW ON THE STRUGGLE AGAINST ATMOSPHERIC POLLUTION (28 DECEMBER 1964) Moniteur Belge (Translated as JPRS No. R-5879-D). Jan. 14, 1965. 345 pp.

This legislation pertains to emissions from whatever source of gaseous, liquid, or solid substances which may cause harm to human health, animals and plants, or prove damaging to property or sites. This legislation also enforces control over devices or installations apt to create pollution, and reserves the right to enforce use of such devices or installations which prevent or control air pollution.

03230

H. Tada

LAWS REGULATING THE EMISSION OF SMOKE AND DUST INTO THE AIR. Text in Japanese. Kuki Seijo (Clean Air - J. Japan Air Cleaning Assoc., Tokyo) 4, (1) 1-5, 1966

The threefold purpose and the content of the law are explained: (1) Regulation of the emission of smoke and dust into the air (2) prevention of air pollution which menaces public health and the establishment of a harmony between the preservation of health environment and the development of industries, and (3) help settle problems arising from air pollution by providing regulations governing the problem. The law defines the area, facilities, and substances to be subjected to the standards of the law.

03243

H. Wiethaup

ON THE AIR POLLUTION LAW (JANUARY 6, 1966) IN LOWER SAXONY. Zum Imschg Niedersachsen vom 6.1. 1966. Gesundheitsw. Desinkt. (Hamburg) May 1966. Text in German.

Regulations established by the new air pollution laws in Lower Saxony are described. Conditions which led to the legistlation are reviewed. It was emphasized that the new law applies only to air pollution resulting from domestic heating and from industrial sources. Pollution from automotive exhaust gases are not treated under these regulations because they would be the subject of separate federal laws. The author would like to see uniform national control of air pollution in Germany.

06754

(EXCERPTS FROM THE ANNUAL REPORT FOR 1964 OF THE STATE INSTITUTE FOR THE PRESERVATION OF CLEAN AIR AND AGRICULTURAL LAND.) Aus dem Jahresbericht 1964 der Landesanstalt fur Immissions- und Bodennutzungsschutz. Reinhaltung der Luft im Land Nordrhein-Westfalen (3) 39-48, 1965. Ger.

A survey was made of the activities of an agency of the State of North Rhine-Westfalia concerned with air pollution problems. Air pollution control programs are described, in particular the first, second, and third program for measuring SO2 and dust concentrations. Instrumentation for measuring SO2, F, H2S, NO2, and NH3 is mentioned. Some practical results of reducing the emission in various industrial plants are presented, mostly of the metal and coal-using industries. Extensive experiments have been made to determine harmful effects of air pollutants on plants. A list of plants ordered according to their susceptibility is given.

07216

DIGEST OF FRENCH LEGISLATION AGAINST ATMOSPHERIC POLLUTION. Resume de la Legislation Francaise Contre la Pollution Atmospherique. Centre Interprofessionnel Technique d'Etudes de la Pollution Atmospherique, Paris, France. (Rept. No. CI 320.) (1966). (Fr.) 9pp.

French legislation, which at first was only concerned with industrial emissions, has now been expanded to include such sources of atmospheric pollution as: industry, heating, automobiles, and also conditions such as ionization, radiation, and noise. Regulations regarding urban conditions are also covered. The excerpts given indicate most of the laws have originated since 1961. Three organization charts are provided which indicate the different groups responsible for legislation, control, advice and research. In general, the law of Aug. 2, 1961 establishes the authority to control pollution which might affect public health and safety, or the condition of buildings or monuments. The correction of the conditions is to be provided for by decree or regulation which may be applied to the emission of pollutants, the construction of buildings, the equipment on vehicles, and the use of fuels. The controls are assigned to the appropriate departments, with penalties which provide for imprisonment as well as substantial fines. Of various regulations affecting the combustion of fuels, the edict of August 11, 1964, (which applied to Paris), fixed zones of special protection in which it was forbidden to use heavy fuel oils containing over 2% sulfur, and decreed that the volatile material in solid materials be limited to 15%. In the edicts affecting urban conditions, the creation of open spaces and wooded areas was provided for in planning.

09009

REPORT OF ACTIVITIES DURING THE PERIOD OF 1 JULY 1966 TO 30 JUNE 1967. Kommunikationsdepartementets Expertgrupp foer att Leda ett Utvecklingsarbete pa Bilavgasomradet 17p., 1967. 7 refs. Translated from Swedish. Joint Publications Research Service Washington, D. C., R-8944-D, 17p., Dec. 14, 1967.

The activities of the Communications Ministry expert group in Sweden are summarized. Some of the purposes of the development work are to make more effective measures possible for reducing harmful substances in auto exhaust gases and to supply the techni- cal foundation for formulating the regulations necessary for this. The investigations and studies indlude the following: (1) In- vestigation of driving methods; (2) Measurement of CO in open air; (3) Testing of Swedish antipollution devices for autos; (4) Measurement of exhaust gas emission during cold and warm starting; (5) Study of crankcase ventilation; (6) Study of diesel exhaust gases; (7) Testing of equipment for a mobile laboratory; and (8) Development of a method for analysis of organic lead compounds. Proposed activities for the coming year are also outlined.

09234

Martinelli, Giorgio

THE CONTINUOUS CONTROL OF AIR POLLUTION WITH INDUSTRIAL ANALYSERS. ((Il controllo continuo dell inguinamento atmosferico con analizzatori industriali.)) Text in Italian. Termotecnia (Milan), 21(10):558-565, Oct. 1967.

For protection against air pollution from increased vehicular traffic, urbanization, and industry, Italy established a law on air pollution control in August 1966. Some provisions of the law are cited. A monitoring system for continuous measurements of air samples involves wind direction, registration of concentrations, determination of pollutants, and the emitter. Better results could be obtained from a network of monitoring stations at various cities, and a plan is proposed for their establishment and operation, where continuous measurement would also be made of air temperature and humidity, concentrations of SO2, H2S, NO2, CO2,CO, and hydrocarbons. Photographs showing equipment and apparatus for the stations are reporduced. A schematic diagram depicts the picoflux apparatus for SO2 measurements; an electrical cell for measuring H2S is also shown. The URAS infrared analyzer is used to measure CO2. Analyses for CO, hydrocarbons and dust are discussed, along with the equipment for air pollution monitoring in Frankfurt, Germany.

11914

L. N. Samoilovich, and Yu. R. Redkin

AIR POLLUTION WITH 3,4-BENZPYRENE FROM PETROLEUM AND CHEMICAL INDUSTRIES. ((Zagryaznenie atmosfernogo vozduha 3,4-benzpirenom predpriyatiyanii neftehimirkeskoi promishlennosti.)) Text in Russian. Gigena i Sanitariya, 33(9):10-14, Sept. 1968. 7 refs.

The 3,4-benzpyrene concentrations of 193 air samples from 2 petroleum refineries, one chemical plant, and the city of Grozny, collected for 3 years by an ERV-49 aspirator and adsorbed on the organic FPA-15 tissue, were determined after extraction with benzene and dilution with n-octane. The refineries had 0.1-40 mKg microgram/100 cu m (with values of 0.8-40 mKg/100 cu m in coke shops), the chemical plant (pyrolysis shop) 0.9-9.1 mKg/100 cu m, and the city sections (distance 50-2000 m from a contact coke plant) 0.08-0.40 mKg/100 cu m maximal 3,4-benzpyrene concentrations. The emission was the highest during full-capacity production, with 2-4-fold increase in a contact coke plant of refinery No 2. By order of the city sanitary physician refinery No2 was closed down temporarily. The furnaces were supplied with gas-forming fuel and hermetization was carried out. It was concluded that within a 2-km radius from a petroleum refinery, there is considerable 3,4-benzpyrene pollution. The most significant sources were the coke and pyrolysis shops.

11951

Konno, Akira

AIR POLLUTION AND FUTURE CITY PLANNING. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 1(1):7-12, 1966. Translated from Japanese. 28p.

Air pollution control measures are necessary at the source which produces the pollutants, at the point where they are emitted, at the stage of diffusion, and at the point where the pollutants finally return to the ground. The control measures for existing urban areas involve staking out industrial zones where all residential facilities ought to be removed and creating so-called green belts or vacant lots. In the case of new development areas, the air pollution situation must be studied and it must be decided which enterprises are allowed into the area and the location. Air pollution sources should not be located in the main direction of the wind to the city. Large structures or buildings should not be erected in the windward and leeward directions of a source. The stack height of an air pollution source should not be equal to the height of the surrounding buildings. Two green belts should be created around pollution sources. Trunk roads should run parallel to the main direction of the wind. The area between the green belts should be reserved for commercial purposes only. Continuous observations of the meteorological conditions in the area are required. The knowledge of the dispersion conditions and the possibility of temperature inversions must be improved. The relationship between the general meteorological conditions and the meteorological conditions in the vicinity of buildings must be studied. The pluming of the waste gases, interference phenomena in an area with many emissions, and the influence of the design and shape of buildings on the degree of pollution and on the distribution of concentration should be the object of intense investigations.

12238

Adolf, Gustof and Eric Holmquist

GOVERNMENT PROPOSITION NO. 122 IN THE YEAR 1968. HIS MAJESTY'S GOVERNMENT'S PROPOSITION TO THE RIKSDAG CONCERNING THE LIMITATION OF THE SULFUR CONTENT IN FUEL OIL: GIVEN AT STOCKHOLM CASTLE APRIL 19, 1968. (Kungl. Maj:ts proposition nr 122 ar 1968. Kung Maj:ts proposition till riksdagen angaende begransning av svavelhalten i eldningsolja; given Stockholms slott den 19 April 1968). 15p., 1968. Translated from Swedish. Franklin Inst. Research Lab., Philadelphia, Pa., Science Info. Services, 26p.

The burning of oil with sulfur content exceeding 2.5% by weight should be prohibited in Sweden after June 30, 1969. The government should be authorized to lower the permitted sulfur content of a fuel oil even further when economic and technical considerations are favorable. A graduation reduction of permissible sulfur content from 2.5% to 1% is anticipated. The responsibility for enforcing the suggested prohibition will be entrusted to provincial governments, who will be permitted to grant exceptions from the prohibition to plants having satisfactory gas purification systems. Local authorities will be granted the right to issue ordinances restricting the sulfur content of a fuel oil below 2.5. Fuel oil dealers will be required to indicate the sulfu content of a fuel oil at the time of its sale. Persons violating the injunction will be subject to a fine or imprisonment. Factors leading to the proposal are the increased acidity of precipitation and surface water in Sweden.

13069

Padovani, Carlo

HOW EXTREME ARE THE RULES AND THE DEFENSES AGAINST AIR POLLUTION/ (A che punto sono la normativa e le difese contro l'inquinamento atmosferico). Text in Italian. Termotecnica (Milan), 23(5): 264-268, 1969.

The new Law no. 615 against air pollution divides Italy into two parts according to factors such as density of population, geographical concentration of industries, meteorological conditions, etc. The Law provides for three types of defenses against air pollution: the elimination or reduction of polluting substances, the separation of polluting substances from smokes and gases before they are vented into the surrounding air, and the reduction of their harmfulness. Enforcement must be directed first toward private heating systems. In this the law follows the example of London, Pittsburgh, Saint Louis and other large cities. Fuels used must burn easily and completely, even in small systems. However, the law is not at all clear in defining fuel quality. Furthermore, the same law often contradicts other rules on fires, tax evasion, etc. Besides the measures provided by Law 615, other actions must be undertaken in Italy to improve air quality. It is imperative to control the population density of urban areas, to increase green areas, to promote the use of electric heating systems, to further research pertaining to better-grade fuels, and to train special technicians for controlling air pollution.

13621

Institute of Sanitation Engineering, Sursan (Brazil), Pollution Control Div.

LEGISLATION AND INSTRUCTIONS ON THE SMOKE EMISSION OF DIESEL-OIL POWERED VEHICLES. (Legislacao e instrucao sobre emissao de furnaca nos veiculos movidos a oleo diesel.) Translated from Portuguese. 20p., 0April 1967. 2 refs.

This monograph discusses (1) the Ringelmann chart, (2) a smokescope, which is proposed to compensate for some of the disadvantages of the Ringelmann chart, (3) air pollution control regulations in Guanabara, Brazil, (4) the amounts of fines for noncompliance to air pollution regulations, (5) a disciplinary code for the restriction of emissions from motor vehicles, (6) a new national code regulating motor vehicles, and (7) the problem of placement of exhaust pipes on motor vehicles.

14708

Legner, M.

ABOUT THE ACTIVITY OF THE STATE TECHNICAL INSPECTION OF AIR CONSERVATION. (Cinnost Statni technicke inspekce ochrany ovzdusi). Text in Czech. Ochrana Ovzdusi, no. 2:17-19, 1969.

Measures against air pollution, according to Act No. 35/1967, are characterized by the imposition of penalties in cases of air pollution, by increased administration power of regional air control authorities, and by increased responsibility of the Ministry of Forestry and Water Resources in the field of air conservation. The State Technical Inspection of Air Conservation is under the direction of the Ministry. Its function is to control sources of pollutants, measure emissions, provide advisory services, impose methods for restricting the emission of noxious substances, and to work closely with health authorities. It has the right to initiate research and development programs. One of its major objectives is the systemized control of emissions from such sources as power stations, heat plants, industrial boiler houses, fuels with a high ash content, chemical plants, metallurgical processes, and concrete works. Through the State Technical Inspection of Air Conservation, the Ministry of Forestry and Water Resources is collaborating with industries on new plant design and applying rigid technical tests to existing plants. Inspection of control equipment is the responsibility of district inspection committees, which have the right to fine both plants and individuals responsible for pollution. It is hoped that better coordination can be realized between district authorities and the national committee. Such coordination is needed to develop combustion tests for the objective control and determination of pollutants escaping from boiler houses.

14798

Liedmeier, G. P.

PREVENTION OF ATMOSPHERIC POLLUTION IN PETROLEUM REFINERIES. (La prevention de la pollution atmospherique dans les raffineries de petrole). Text in French. Pollut. Atmos. (Paris), 11(Special):3-8, Feb. 1969.

A review of atmospheric pollution and problems in controlling it in the refineries of Europe is presented. The author discusses the founding of CONCAWE (Conservation of Clean Air and Water-- Western Europe), which is a group of oil companies and societies representing 80% of the refining capacity in Western Europe. Its functions are to process information pertaining to pollution by refineries and the joint study of pollution problems. It now has working groups in the following areas: study of the height of chimneys and atmospheric dispersion; liquid effluents; petroleum pipelines; subterranean migration of petroleum; and noise abatement. The sources and effects of refinery pollution, particularly by sulfur oxides, hydrocarbons, and malodorous gases are reviewed. Particulate matter and nitrogen oxides are considered of secondary importance. A brief review of methods for combatting pollution is also included.

17669

Burenin, N. S., B. B. Goroshko, and B. N. P'yantsev

FIELD STUDY OF AIR POLLUTION IN INDUSTRIAL CITIES. (Ekspeditsionnoye izucheniye zagryazhehiya vozdushnogo basseyna promyshlennykh gorodov). Text in Russian. Tr. Gl. Geofiz. Observ. (Leningrad), no. 234:100-103, 1968. 9 refs.

The organization of air pollution monitoring procedures is outlined in general. Preliminary analysis of data gathered throughout an unidentified city is discussed and a sample organizational plan is given. Single episodal examination of pollution conditions used to establish a continuous monitoring plan is discussed. No specific locations are mentioned.

19408

METHODS OF MEASURING DUST CONTENT IN STACK GAS. Japanese Industrial Standard JIS Z 8808, 34p., June 1963. 4 refs. Translated from Japanese. Belov and Associates, Denver, Colo., 67p., Jan. 28, 1970.

A method for sampling and measuring the dust and moisture content of industrial stack gases is established by Japanese public law. Conditions are specified for location for obtaining sample, method of sampling, and methods of analysis. A comprehensive discussion provides the history of the development of the standard as well as details of application.

19723

Leden, J.

THE LEGAL ARRANGEMENT AND ORGANIZATION OF THE PROTECTION OF THE ATMOSPHERE IN CZECHOSLOVAKIA. (Pravni uprava a organizace ochrany ovzdusi v CSSR). Ochrana Ovzdusi, vol. 1, Jan. 1969. Translated from Czech. Belov and Associates, Denver, Colo., 22p., April 20, 1970.

The Czechoslovakian Law No. 35/1967 Sb. has made it possible to create a system of effective measures against air pollution. Fees for atmospheric pollution must be paid by any pollutor that releases large amounts of noxious materials into the atmosphere, primarily ash and sulfur dioxide, in any degree that exceeds the given standards. The protection of the atmosphere is centralized directly by the Ministry of Forestry and Water Economy and the State Technical Inspection for the Protection of the Atmosphere. Tasks have also been allocated to the Hydrometeorological Institute. It is suggested that the validity of the law be expanded to include such pollutants as secondary dust, steam traction, exhaust gases from combustion engines, radioactivity, and noxious fumes.

19920

Seidl, W.

AIR CONSERVATION LITERATURE -- HOW IT IS OBTAINED, EVALUATED, AND PUT TO USE. (Die Literatur ueber Reinhaltung der Luft -- ihre Erfassung, Auswertung und Nutzbarmachung). Text in German. VDI (Ver. Deut. Ingr.) Ber., no. 149:359-366, 1970.

As is true for scientific disciplines in general, there has been a 'literature explosion' on the subject of air pollution control. The USA is far in the lead in the production of such literature, followed by the USSR, West Germany, England, France, and Italy. Other countries were contributing about 10% of the literature, as of 1963. The VDI (Society of German Engineers) began an air pollution documentation service in 1957. The storage unit now contains better than 40,000 titles and over 230,000 card entries, arranged on a 3-track system in terms of type of pollution, emission source, and main subject. A description is given, with illustrative examples, of the manner in which material is stored and retrieved.

23608

Public Nuisance Control Committee (Japan)

BASIC POLICY REGARDING THE ESTABLISHMENT OF PUBLIC NUISANCE CONTROL PROGRAM FOR THE OSAKA AREA. (Osaka chiiki ni kakawaru kogaiboshikeikaku sakutei no kihon hoshin. An). Text in Japanese. Yosui to Haisui (J. Water Waste), 12(9):759-767, Sept. 1, 1970.

A control program is presented which is to be effective throughout Osaka Prefecture which has long been developing as a large industrial area; the enormous economic activity has added much to the pollution problem. Air pollution is severe in the central and Hanshin coastal industrial district, and water pollution is significant in Yodo, Kanzaki, Neya and Yamato Rivers. Water quality in Osaka Bay has deteriorated to the extent of ruining the fishing industry. The ground settling problem in East-Osaka, and the noise from Osaka International Airport have invited many complaints. The pollution levels are to be lowered to within the tabulated limits by 1980. There are many necessary control measures, but the following are especially emphasized in view of the national planning priorities. They are the control measures against stationary air pollution sources, purification of coastal waters and rivers and streams, control of nuisances accompanying automobile traffic, treatment measures for metropolitan and industrial wastes, and the control of airport noises. In addition, surveillance and measurement systems as well as cooperation with th neighboring prefectures are indispensible. Detailed tables are given on the target maximum allowable concentrations of sulfur oxides, suspended particulates, and carbon monoxide in air as well as for cyanides, alkyl mercury, organic phosphorous, cadmium, lead, chromium, arsenic, and mercury in general for water pollution. Values for pH, BOD, SS, DO and coliform bacteria counts are also given. The maximum allowable noise levels for daytime, morning and evening are also listed.

23610

Public Nuisance Control Committee (Japan)

BASIC POLICY REGARDING THE ESTABLISHMENT OF A PUBLIC NUISANCE CONTROL PROGRAM FOR THE TOKYO AREA. (Tokyochiiki ni kakawaru kogaiboshikeikaku sakutei no kihonhoshin. An). Text in Japanese. Yosui to Haisui (J. Water Waste), 12(9):750-758, Sept. 1, 1970.

A control program to be effective throughout the Tokyo metropolitan area other than islands in the Pacific Ocean under the jurisdiction of the metropolitan government is presented. The area is a megalopolis with 11.5 million people, and the industrial and economic activities are increasingly exacerbating the pollution problem. Air pollution from automobiles and factories is severe. It originates from the central and Joto areas as well as from factories along the Arakawa River and Sumida River. Water pollutio in Sumida, Naka, and Tama Rivers is also intense. The pollution levels are to be lowered to within the tabulated limits by 1980. The necessary control measures are numerous, but the following are especially emphasized in view of the national planning priorities. They are the control measures against stationary air pollution sources, purification of sea water in the coastal areas and fresh water in rivers and streams, control of nuisances accompanying automobile traffic, control of ground settling (in some areas as deep as four meters), and treatment measures for metropolitan and industrial wastes. In addition, the establishment of nuisance monitoring and measurement system is necessary, and close cooperation with the neighboring prefectures is indispensable. Detailed tables are given on the target maximum allowable concentrations of sulfur oxides, suspended particulates, and carbon monoxide in air as well as cyanides, alkyl mercury, organic phosphorus, cadmium, lead, chromium, arsenic, mercury in general and pH, BOD, SS, DO, and coliform bacteria values for water pollution. The maximum allowable noise levels for daytime, morning and nighttime are also listed.

24214

Public Nuisance Control Committee (Japan)

BASIC POLICY REGARDING THE ESTABLISHMENT OF PUBLIC NUISANCE CONTROL PROGRAM FOR THE KANAGAWA AREA. (Kanagawa chiiki ni kakawaru kogai boshikeikaku sakutei no kihon hoshin. An). Text in Japanese. Yosui to Haisui (J. Water Waste), 12(9):768-776, Sept. 1, 1970.

A control program to be effective in the area East of Sagami River within Kanagawa Prefecture is presented. This area serves as the mainstay of the Japanese economy, industries such as electric power, steel, petroleum, chemicals and heavy automobile traffic have contributed to the chronic pollution problems. Air pollution in the Taishi and Tajima areas and water pollution in Tama, Tsurumi, and Katabira Rivers as well as Tokyo Bay are extremely severe. The pollutant levels are to be lowered to within the tabulated limits by 1980. There are many necessary control measures, but the following are especially emphasized in view of the national planning priorities. They are the control measures against stationary air pollution sources in Kawasaki, especially purification of coastal waters and rivers and streams, control of nuisances accompanying automobile traffic, and treatment measures for metropolitan and industrial wastes. In addition, surveillance and measurement systems as well as cooperation with the neighboring prefectures are indispensable. Detailed tables are given on the target maximum allowable concentrations of sulfur oxides, suspended particulates, and carbon monoxide in air as well as cyanides, alkyl mercury, organic phosphorus, cadmium, lead, chromium, arsenic, mercury in general, and pH, BOD, SS, DO and coliform bacteria values for water pollution. The maximum allowable noise levels for daytime, morning and evening are also listed.

32193

Swedish Dept. of Justice, Stockholm

SWEDISH CODE OF STATUTES NO. 387. In: Legislation on Protection of the Environment. June 24, 1969. Translated from Swedish by McGregor and Werner, Inc., Washington, D. C., Mundus Systems, p. 1-25.

A Law on the Protection of the Environment is presented, applicable to the discharge of water, solid material, or gas from terrains, structures, or installation, into water courses, lakes, or other water surface, and to the use of terrains, structures, or installations in a manner which may bring about damage to the environment through pollution of air, noise, concussion, light, or other agencies, if the damage is not altogether accidental. Committee for Environmental Protection Permits may authorize activities dangerous to the environment. The King may prescribe that certain factories shall not be created. The Permit Committee consists of a chairman and three other members. For the purpose of affording protection against activity dangerous to the environment, supervision shall be carried out by the States nature protection office and by provincial governments.

32194

Swedish Dept. of Justice, Stockholm

SWEDISH CODE OF STATUTES NO. 388. In: Legislation on Protection of the Environment. June 24, 1969. Translated from Swedish by McGregor and Werner, Inc., Washington, D. C., Mundus Systems, p. 26-43.

A proclamation regarding protection to the environment is presented in which factories needing authorization to be set up were listed. These include mines, sintering plants, metal plants, cement factories, sugar factories, dairies, slaughterhouses, breweries, tanneries, chemical factories, fertilizer factories, rubber factories, pharmaceutical factories, refineries, atomic power installations, steam power plants, coal or gas works, and waste treatment and disposal installations. The procedure before the Permit Committee and State Health Care Office is outlined.

32195

Swedish Dept. of Justice, Stockholm

SWEDISH CODE OF STATUTES NO. 395. In: Legislation on Protection of the Environment. June 24, 1969. Translated from Swedish by McGregor and Werner, Inc., Washington, D. C., Mundus Systems, p. 96-98.

An amendment to the Health Protection Statute of December 19, 1958 is presented stating that the health protection committee shall see that reasonable measures are adopted for combatting water, air, and noise pollution. Special provisions are given prohibiting the installation of alteration of factories without prior examination by the Permit Committee for Protection to the Environment, the state nature protection office, or the provincial government.

32196

Swedish Dept. of Justice, Stockholm

SWEDISH CODE OF STATUTES NO. 394. In: Legislation on Protection of the Environment. June 24, 1969. Translated from Swedish by McGregor and Werner, Inc., Washington, D. C., Mundus Systems, p. 94-95.

An amendment to the nature protection law of December 11, 1964 is presented stating that provisions are to be found in the Law on Protection of the Environment of May 29, 1969 regarding protection against pollution of water, pollution of air, noise, and ther such disturbances.

32197

Swedish Dept. of Justice, Stockholm

SWEDISH CODE OF STATUTES NO. 392. In: Legislation on Protection of the Environment. June 24, 1969. Translated from Swedish by McGregor and Werner, Inc., Washington, D. C., Mundus Systems, p. 57-58.

An amendment of the proclamation of January 4, 1939 giving directions in the field of civil administration regarding limitations on the right to secure copies of public transactions is presented. Article Two was amended to read as follows: transactions having to do with the supervisory activity which is carried out in accordance with the Law on Protection of the Environment of May 29, 1969, and also corresponding supervisory activity in accordance with older provisions.

32198

Swedish Dept. of Justice, Stockholm

SWEDISH CODE OF STATUTES NO 391. In: Legislation on Protection of the Environment. June 24, 1969. Translated from Swedish by McGregor and Werner, Inc., Washington, D. C., Mundus Systems, p. 54-56.

An amendment to the provincial government instruction of May 30, 1958 is presented stating that the provincial government shall concern itself with social welfare, planning and construction activity, nature protection including water and air protection, highway activity, traffic, and fire protection. The provincial government also has to deliver to the State s nature protection office proposals for the computation of national outlays for nature protection within the province.

32199

Swedish Dept. of Justice, Stockholm

SWEDISH CODE OF STATUTES NO 390. In: Legislation on Protection of the Environment. June 24 1969. Translated from Swedish by McGregor and Werner, Inc., Washington, D. C., Mundus Systems, p. 51-53.

An amendment of the instruction of May 25, 1967 for the state s nature protection office is presented. The office is a central administrative authority for cases regarding the protection of nature, including air and water protection. The members of each of the nature protection and air protection councils are the director general and a maximum of nine other members.

32200

Swedish Dept. of Justice, Stockholm

SWEDISH CODE OF STATUTES NO. 248. In: Legislation on Protection of the Environment. June 24, 1969. Translated from Swedish by McGregor and Werner, Inc., Washington, D. C., Mundus Systems, p. 106-111.

A proclamation regarding the real estate court is presented, designating public lower courts as real estate courts and indicating the judicial districts. A law-experienced member, other than the chairman, on a real estate court, and the technical member on a real estate court are appointed by the circuit court under which the real estate court falls. For each circuit within the judicial district of a real estate court, the circuit court under which the real estate court falls shall determine the number of jurymen who are provided. A separate register shall be kept for cases handled by the real estate court.

32201

Swedish Dept. of Justice, Stockholm

SWEDISH CODE OF STATUTES NO 246. In: Legislation on Protection of the Environment. June 24, 1969. Translated from Swedish by McGregor and Werner, Inc., Washington, D. C., Mundus Systems, p. 99-104.

A law regarding the Swedish real estate court is presented. The real estate court exists in every province and takes up the matters and cases indicated in a special statute. The court consists of a chairman and four other members. The chairman is selected from among the qualified judges in the public lower court. The other members of the court shall include one qualified judge from a lower court with technical training and experience in the organization and appraisal of real estate.

32202

Swedish Dept. of Justice, Stockholm

SWEDISH CODE OF STATUTES NO. 249. In: Legislation on Protection of the Environment. June 24, 1969. Translated from Swedish by McGregor and Werner, Inc., Washington, D. C., Mundus Systems, p. 112-113.

An amendment of the proclamation of November 2, 1962 concerning the judicial districts of the borough police courts is presented, stating that the superior court for a matter or case which is being pursued from a public lower court in possession of a real estate court is the circuit court under which the lower court falls.

32203

Swedish Dept. of Justice, Stockholm

SWEDISH CODE OF STATUTES NO. 247. In: Legislation on Protection of the Environment. June 24, 1969. Translated from Swedish by McGregor and Werner, Inc., Washington, D. C., Mundus Systems, p. 105.

A proclamation regarding the promulgation of the law of May 29, 1969 concerning the real estate court is given. It was stated that the law of May 29, 1969 shall come into force on July 1, 1969.

32204

Swedish Dept. of Justice, Stockholm

SWEDISH CODE OF STATUTES NO. 389. In: Legislation on Protection of the Environment. June 24, 1969. Translated from Swedish by McGregor and Werner, Inc., Washington, D. C., Mundus System, p. 44-50.

Instructions to the Permit Committee for Protection of the Environment are presented. The Committee will have a chief engineer and a secretary. Major questions of statute law, organization, proposals for budgetary presentations, and disciplinary punishments will be decided in plenary session. In plenary session cases the Committee is qualified to decide when all of its members are present. If any person present during the final consideration of a case or presentation has a dissenting opinion, it should be noted.

32205

Swedish Dept. of Justice, Stockholm

SWEDISH CODE OF STATUTES NO. 393. In: Legislation on Protection of the Environment. June 24, 1969. Trnaslated from Swedish by McGregor and Werner, Inc., Washington, D. C., Mundus Systems, p. 59-93.

Amendments to the water law are presented. Waste water is defined as overflow water, water used for industrial cooling, or drainage water. Waste run-off is regulated. Measures for combatting water pollution are outlined. The responsibility of a real estate owner is also established.

M. SOCIAL ASPECTS

11950

Hayashi, Yujiro

IMPORTANCE OF SOCIAL CONSUMPTION. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 1(1):5-6, 1966. Translated from Japanese. 6p.

The per capita income in Japan, which was 690 dollars in the fiscal year 1965, will about triple over the next 20 years. This does not mean, however, that the individual property will increase as much, since a good deal of the individual income will be spent for the maintenance of clean air and water. Some day, a special tax called air tax will have to be raised from each individual to pay for the enormous costs of anti air pollution measures. Such measures require re-orientation of the common thinking from the private-property-oriented-society to a society concerned about such matters and willing to contribute to this cause a certain percentage of their income.

14491

Ohira, M., H. Maruya, and T. Nagira

A STUDY OF AWARENESS AND OPINION OF THE RESIDENTS ABOUT PUBLIC NUISANCES IN MIZUSHIMA (NEWLY DEVELOPED INDUSTRIAL AREA). (Mizushima chiku jumin no kogai ni tsuite no ishiki jokyono chosa). Text in Japanese. Nippon Eiseigaku Zasshi (Japan J. Hyg.), 24(1):99, April 1969.

Air pollution has been intensified in Mizushima, due to the introduction of the steel and oil industries. A survey of subjective symptoms and opinion on air pollution was conducted among 182 households in the area regarded as most polluted (called area A) and 88 households in apartments owned by one of companies regarded as a polluter in this area (area B). Complaints such as eye irritation, frequent coughing and expectoration, and malodorous air were heard more frequently at A than at B. People from area A, who once welcomed the introduction of industry, are much more displeased with it than people from area B, who belong to the industry. However, the former are becoming reconciled to this pollution. They do not believe that the local government or industry will control air pollution. Furthermore, they have little confidence in the ability of a civic association to eliminate public nuisances and would rather move out of the area than oppose pollution. On the other hand, people working in the offending industry pay little attention to nuisances. It is concluded that the opposition of residents to public nuisances should be supported by physicians, scientists, and other actively concerned persons.

15760

Lindvall, Thomas

THE NUISANCE EFFECTS OF AIR POLLUTANTS. (Luftfoeroreningars olaegenhetseffekter). Text in Swedish. Nord. Hyg. Tidskr. (Stockholm), no. 3:99-115, March 1969. 11 refs.

Annoyance reactions from odorous and particulate air pollutants were regarded as medico-hygienic problems in Sweden. Legislation in Sweden permits intervention based solely upon subjective annoyance reaction to some extent. Nuisances from industrial plants are usually caused by odors and particulate matter. Complaints were reported in 78% of urban and 27% of rural communities. The medico-hygienic evaluation of nuisance from air pollution includes studies of the dose-response relationship between the pollutant in the ambient air and the extent and strength of the annoyance reaction. The description of the dose is often complicated by the fact that many odorous substances are hard to detect while they still have odor. Therefore, the concentration in the ambient air is often based upon analysis at the source combined with meteorological spreading calculations. From a statistical point of view, there is often a satisfying correlation between predicted and actual concentrations in the ambient air. The organoleptic principle of analysis of odorous emission was used more frequently during the last few years. Odor threshold determinations were successfully used in testing odor abatement equipment and in dose description around pulp mills. The frequency is calculated by which a certain concentration is exceeded at different distances from the source. The description of the dose was satisfactorily worked out by the use of standardized, sociological inquiries with special attention to certain effects of interaction, such as disquising of or differences in attitude. Response studies were undertaken in Sweden around pulp mills and oil refineries. (Author summary modified)

26429

A SYNTHESIS OF THE STUDY. (Sintesi dell'indagine). In: Public Campaign Against Pollution: A Summary. (L'intervento pubblico contro l'inquinamento: Rapporto di sintesi). Text in Italian. Gianni Scaiola (ed.), Italy, June 1970, p. 13-62, 17 refs.

This report provides a summary of cost estimates and economic benefits connected with a project to eliminate the principal forms of air and water pollution in Italy. This section of the report deals with the theoretical presuppositions and methods of study used for the project and a report on the methods and results of economic studies made in Italy and elsewhere. The pollution problem has been studied by a variety of approaches, which include biology, ecology, city planning, and public sanitation, but economic analysis has been sadly neglected. Such analysis is a prerequisite for a realistic strategy in dealing with the problems. Some basic problems facing the economist are the best possible allocation of our limited natural resources and that of the possible distribution and minimization of costs created by the pollution problems. There needs to be a restatement, for one thing, of what natural resources are considered to be in 'public domain'. Historically, a first attempt of analysis of the economic implications of pollution was that of the Mellon Institute in Pittsburgh, conducted in 1913. Its main weaknesses were the inordinate attention given to the computation of damages rather than of the costs of prevention; The first study to consider pollution damage on a national scale was the Beaver Commission Study of 1954, in Great Britain. This report is examined in detail. In the United States, an estimate given by the Harvard Business Review projected the need to spend 275 billion dollars over the next 34 years in order to eliminate pollution. President Nixon, in his 1970 message to Congress, set the investment figures at 10 billion dollars per annum for the next 5 years. In Italy, the author Spirroni has estimated the annual cost of air and water pollution control, from industrial sources only, at 1.5-2.0 trillion lire. The portion to be used for air pollution amounts to 650 billion lire. A 1970 estimate of air pollution damages in Italy gives a total figure of about 350 billion lire per annum, about 4/5 pf which is traceable to domestic heating and automotive traffic.

N. GENERAL

04052

R. Haddad and J. J. Bloomfield

ATMOSPHERIC POLLUTION ON LATIN AMERICA. Bol. Ofic. Sanit. Panam. 58, 241-9, Sept. 1964. Sp. (Tr.) (Presented at the Inter-Regional Symposium on Criteria for Air Quality and Methods of Measurement, Geneva, Switzerland, Aug. 6-12, 1963.)

Latin America is an area which is experiencing a very rapid population and industrial expansion. Although this growth is very irregular, the cities which exceed a million inhabitants and the industrial concentration in them is growing yearly. This phenomenon has resulted in serious problems of air pollution in Sao Paulo, Brazil, Santiago, Chile, Mexico City, Mexico, which are in need of further investigation and control as quickly as possible. There are potential problems in Buenos Aires, Argentina, and in all those large metropolitan centres which are growing and industrializing rapidly. The situation created in Lima, Peru, because of the fishmeal industry, seems to be fairly well controlled. The greatest necessity is to train personnel capable of conducting studies in measuring air quality and controlling the contamination of the air. There is also a necessity to create a consciousness of the seriousness of the problem among government authorities and the public in general. It is hoped that the future development of the Institute of Occupational Health and Air Pollution Research in Santiago, Chile, will contribute effectively to achieve these objectives.

10260

Prince-Epstein, D.

STUDIES ON ATMOSPHERIC POLLUTION IN THE SOVIET UNION. ((Recherches sur la pollution atmospherique en union Sovietique.)) Text in French. Bull. Inst. Natl. Sante Rech. Med. (Paris), 23(1): 63-82, Jan.-Feb. 1968. 57 refs.

In this W.H.O.-financed survey and visit to four institutes each in Moscow and Leningrad, the state-of-the-art in Russian air pollution control is reviewed. The principal centers for research are the Institute of General and Urban Hygiene 'A. N. Sysin', several medical institutes, sanitary and epidemiological stations, and other centers such as the Institute for Industrial Hygiene and Professional Diseases in Leningrad. Air pollution control consists essentially of the following measures: definition of air purity standards (much stricter than standards in America), and the determination of minimal permissible levels by means of very precise physiological tests, such as the olfactory threshold test, encephalography, and dark adaptation. Chronic tests are conducted on animals in specially designed exposure chambers, with special attention to effects on the conditioned reflexes, muscular coordination, cholinesterase activity, urinary coproporphyrins, as well as hematological, biological and other physiological data. A Russian commission was created in 1949 to determine norms for air pollutants. Principal laws promulgated by the Committee for the Sanitary Protection of the Air are: construction of industries with some provision for removal or capture of toxic substances, prohibition of emissions of dusts and toxic gases into the atmosphere, and a classification of industrial centers according to their harmfulness to health, with corresponding zones of protection between the plant and the inhabitants. The analytical methods used in the determination of CO, SO2 and H2SO4 aerosols, nitrogen oxides, ozone, and permissible levels for both daily and one-time exposures. The general results of 18 Russian studies on CO and nine studies on sulfur oxides are tabulated, and references given for work on nitrogen oxides, 3,4-benzopyrene, and ozone. The theoretical basis for the combined effects of pollutants is discussed.

15096

Bassetti, P.

AIR, WATER, AND SOIL POLLUTION AFFECTING THE CITY AND PROVINCE OF MILAN. (L'inquinamento dell-'aria, dell'acqua e del suolo, nei riguardi di Milano e del suo Territorio). Text in Italian. Ing. Sanit., 16(2):88-101, Jan. - Feb. 1968. 7 refs.

Air pollution derives from three principle sources: oil refining and petrochemistry (20%), home heating (60%), and motor traffic (20%). In Milan and Turin, smog in the atmosphere has reduced the lifetime of automobile finishes by 50%. Italy has only recently confronted the air pollution problem, and few Italians realize the high cost of its prevention. A company in the city of Cornigliano has spent 1.5 billion dollars for equipment to combat air pollution. Proper adjustment of home heating equipment would diminish smog by 40% and would give a 20-25% saving on fuel oil. The Italian law of July 13, 1966 divides the entire nation into two control zones: (1) communities in north central Italy with 70-300 thousand inhabitants or special air pollution problems, and insular Italian communes with populations ranging from 300,000 to one million; (2) communities of north central Italy of 300,000 or more and of southern Italy with one million or more. Factories and plants are subject to regulation when their power output is more than 30,000 kcal/hr. No limitations are made on combustible liquids and gases; petroleum distillates such as kerosene and gasoline with 10% or less sulfur; coke with 2% or less of volatile materials and 1% or less sulfur; or coal with 13% or less volatile materials and 2% or less sulfur. Wood and charcoal are prohibited. Limitations are placed on combustible fluids with more than 5 Engler degrees of viscosity at 50 C and 3% or less sulfur content. Plants must conform to these regulations by December 31, 1969. More than 75% of this article is concerned exclusively with water pollution and the establishment of a 'Po Valley Authority' to deal with water and soil pollution problems of that geographical area.

18309

Spurny, K.

PHYSICS AND CHEMISTRY OF ATMOSPHERIC EMISSIONS AND IMISSIONS. (Fyzika a chemie atmosferickych emisi a imisi.) Ochrana ovzdusi, p. 11-13, 1969. Translated from Czechoslovakian.

Air pollution has been recognized as a problem since the time of the ancient Greeks. Until recently, however, the chemistry and physics of pollution have not been treated as a separate entity. Concern for the cleanliness of the atmosphere did not become a worldwide health and economic problem until the years following World War II. Emissions from coal-burning power plants are and will for the next 30 years be Czechoslovakia's chief source of atmospheric contamination. 'Tunnel' research, work done in physics, chemistry, and biology, should make it possible to survive periods of polluted atmosphere without health and economic crises. Both emissions and imissions are serious, and must be controlled by legislatures and industries according to the environmental situation. Solid and liquid particles dispersed in the atmosphere are termed dispersive and colloidally dispersive aerosols, according to the size of the particulate matter. Studies are being made of aerosol classification, electrical and mechanical properties, particle coagulation, and naturally occuring aerosols. This rapidly increasing study of air pollution is resulting in a new technology.

21654

Cerovsky, J.

QUESTIONS OF THE POLLUTION OF THE NATURAL ENVIRONMENT AT THE INTERGOVERNMENTAL CONFERENCE ON THE BIOSPHERE. (Otazky znecistovani prirodniho prostredi na mezivladni konferenci o biosfere). Ochrana Ovzdusi, vol. 1, Jan. 1969. Translated from Czech. Belov and Associates, Denver, Colo., 12p., April 20, 1970.

Among the main themes of the 1968 Intergovernmental Conference on the Biosphere was the pollution of the living environment. Reports submitted to the conference noted the obvious connection between water, air, and soil pollution and the damaging effects of pollution on man and vegetation. Both air and water pollution were the result of increased utilization of fossil fuels, increased production of organic chemicals, urbanization, and the rapid rise in motor vehicles in the past decade. Since the beginning of the sixties, the sulfur dioxide and carbon monoxide content of air has been increasing, while the pH of atmospheric precipitation has been decreasing. The damaging effects of carbon monoxide on the central nervous system and on blood circulation have been established, as has the relationship between atmospheric pollution and chronic bronchitis. Since industrial production in industrialized countries will roughly double within the next 20 years, preventive measures are imperative to save the living environment. Technology as it exists today must be intensively applied, and research and development must be intensified. Also of extreme importance is the cooperation of the medical and biological sciences in the clarification of the mutual relations and mechanisms of the action of noxious materials. International organizations should decide which organic materials should be the primary object of research and control. In addition, methods of unified control should be studied as a means of achieving world control of the atmosphere, soil, water, and organisms.

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